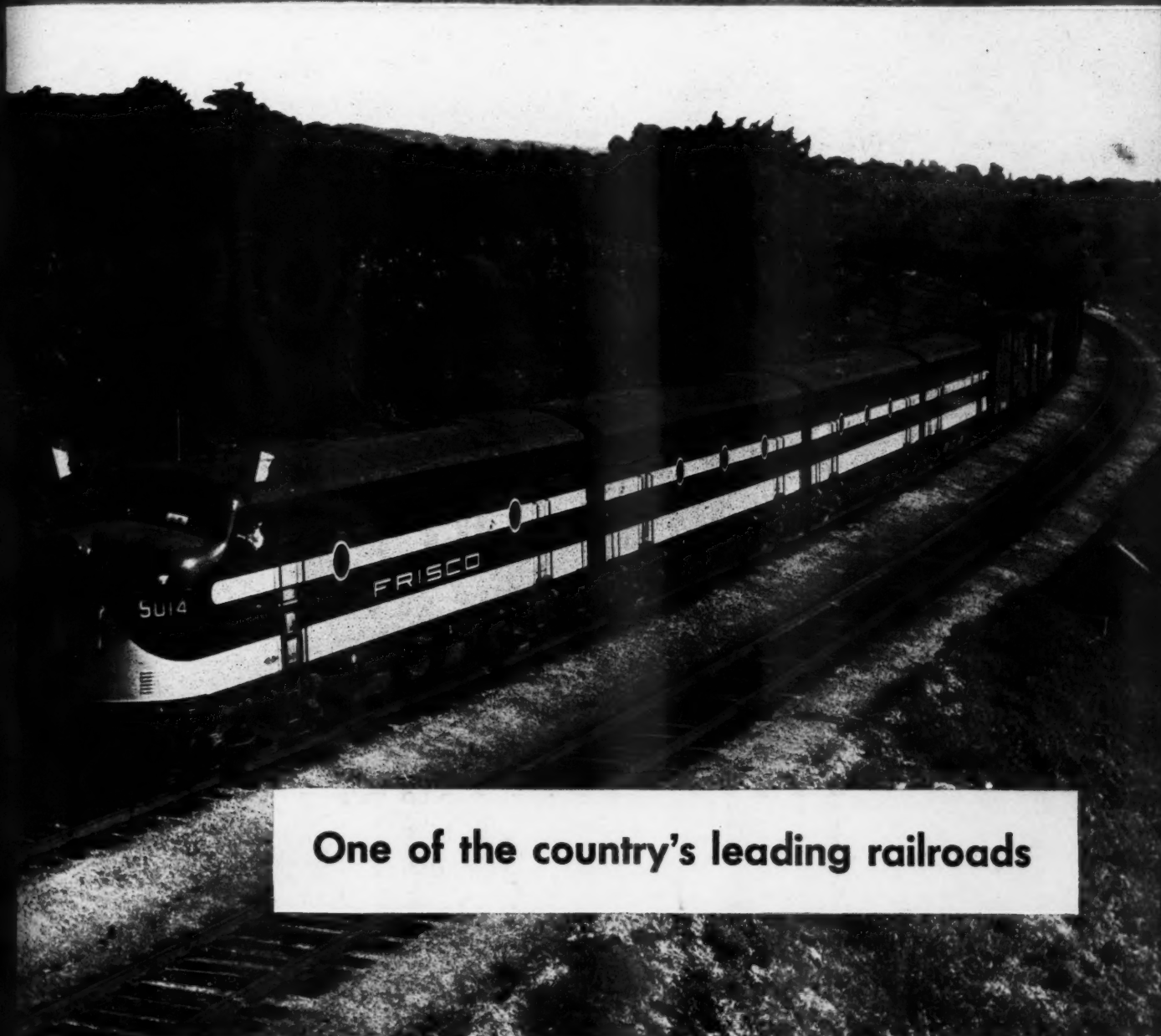


May 1957

RAILWAY

TRACK *and* STRUCTURES

A Simmons-Boardman Publication



One of the country's leading railroads

RAIL JOINT COMPANY
DIVISION OF POOR & COMPANY, INC.
50 CHURCH STREET, NEW YORK 7, N. Y.

Try...

**Compare these features
of the
Kershaw Jack-All
with other machines:**

- ★ Tried and proven by four years actual service on railroads.
- ★ No spotting problems. You spot for the jack and the tamping feet automatically are pre-set to tamp adjacent ties.
- ★ Tamps two ties at the same time.
- ★ The Kershaw Jack-All is equipped with a dial indicator-type or pendulum cross-level sighting device.
- ★ Dogs automatically compensate for varying rail heights and the Kershaw Jack-All is on the track at all times.
- ★ One man operated. Self-propelled.

**Now...more
than ever...**

**Recognize This Symbol
of Leadership...**



The Kershaw Jack-All

Before You Buy!

Try before you buy . . . Why invest thousands of dollars in a trackwork machine before you KNOW that it will do the job your operations demand?

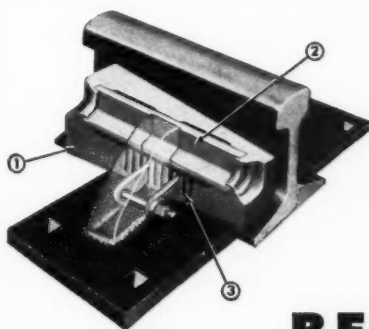
Kershaw Manufacturing Company will be happy to arrange a test demonstration of the Kershaw Jack-All, or any Kershaw machine, on your railroad, operating under your conditions. There's no obligation. Then you will know that the machine can do the job you want done before you buy it.





How this brace can brace!

Rail keeps growing heavier, trains keep rolling faster. But no matter to Model 811 Rail Brace; it just puts its shoulder to the job, and budges not a smidgen. No thrust or impact ever knocks the 811 out of whack!



Sound design provides the reason. At the bottom of it all is a steel plate, roughly similar to a regular tie-plate. Welded to the plate is the forged bracing member. A specially shaped wedge (1), containing an angular spring-steel piece (2), fits snugly into place between rail web and brace. (The brace is machined, where it makes contact with the wedge, with a horizontal slope of 1 in 16, and a vertical slope of 1 in 8.)

When the wedge is driven sufficiently tight to compress the spring $1/32$ in., the pawls attached to either side of the brace are turned down into the slots (3) milled into the wedge. This locks the whole assem-

bly together, and makes it virtually integral with the running rail. That rail just has to stay put!

Adjustments can be very easily made, as needed. The only tool required for either installation or adjustment of the 811 is a spike maul or a hammer.

A Bethlehem engineer will be glad to explain the Model 811 Rail Brace in full detail. You can reach him through any Bethlehem sales office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation, Export
Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

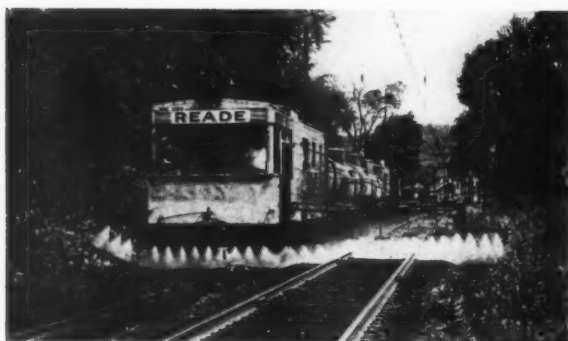


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*Who was the astute man
who said . . . "If you don't know
all about the merchandise
be sure you know the merchant"?*

Frankly, we do not know the originator of this phrase. But we can think of no merchandise which could be better applied to this phrase than weed or brush killing chemical.

There is so much about such chemicals that is not understood, so much about plant life and weather conditions that baffle even the scientists who have made the study of the subject their lives' work.



If you question this statement, just recall the many papers that have been read on the subject of recent years. Always there is injected into the conclusions . . . "Providing, etc. etc."

With so many uncertainties to be faced, it would seem that the success of any weed or brush control program must hinge on the experience of the organization to whom the work is entrusted.

Here is where the Reade organization deserves consideration.

This is our seventy-fifth year in business. All of those years have been devoted almost exclusively to study of vegetation control types of work. An organization such as we maintain over the full calendar year can only be recruited by a process of weeding out and refining.

Perhaps the best tribute to the effectiveness of the organization is to note the long list of large and small railroads that entrust their programs to the Reade Company. Of particular interest is the fact that year after year, when funds are available for such work, the business is placed in the hands of the Reade Company.

To a man lacking experience in such work, study of the accomplishment of these railroads might be time well spent and very enlightening.

We welcome the opportunity to make our records available for your perusal.



READE MANUFACTURING COMPANY, INC.

JERSEY CITY 2, N. J.

WORKS: JERSEY CITY • CHICAGO • KANSAS CITY • MINNEAPOLIS • BIRMINGHAM • STOCKTON

1931 **26 CONSECUTIVE YEARS** 1957 MODERN BALLAST CONDITIONING



BEFORE "R. B. C. C." Service



AFTER "R. B. C. C." Service

"R. B. C. C." ballast cleaning service has earned its outstanding performance record from 26 years of successful operation. Our 3 and 5 unit trains are entirely self contained on our own standard railroad equipment—No railroad cars are used or tied up.

"R.B.C.C." 5 unit equipment does a thorough ballast conditioning job, cleaning two center ditches or two shoulders or one of each at one trip.

"R.B.C.C." 3 unit equipment, self propelled, does a thorough ballast conditioning job, cleaning one shoulder at one pass on one side only.

"R.B.C.C." ballast cleaning or excavating service, complete with our own personnel and equipment, is handled on contract basis.



RAND TOWER
MINNEAPOLIS, MINN.



METROPOLITAN BANK BLDG.
WASHINGTON, D. C.





One of the first ALL STEEL STRUCTURES...



Above left, oxygen cut being made in deck of old bridge. Directly above, old bridge is dwarfed by new lift span.

Goes the fast, efficient way of oxygen cutting

Sixty-three years old, and one of the first all steel structures built in the United States, the steam operated swing span, shown at left above, has carried up to 140,000 passengers a day in and out of New York's busy Manhattan Island. After suffering the mechanical ills of old age, this New York Central Railroad bridge was skillfully removed by using LINDE oxygen cutting.

The old bridge had a four track right of way with a girder structure separating tracks 1 and 3 from 2 and 4. After the tracks were taken up, the deck of the bridge was divided by a series of transverse and longitudinal cuts, and re-

moved. Super structure beams were next to be cut off. Finally, the main side girders were cut into portable lengths and lowered away.

Oxygen and acetylene gases were supplied to the cutting torches by centrally located LINDE cylinders manifolded together.

No matter what your fabricating, repairing, or scrapping needs may be—LINDE can help you do the best job, in the least amount of time. Call your local LINDE representative for detailed information on LINDE's processes—or write for specially prepared literature. Start saving now, do it today.

RAILROAD DEPARTMENT



Linde Air Products Company
A Division of Union Carbide and Carbon Corporation

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Division of Union Carbide Canada Limited, Toronto

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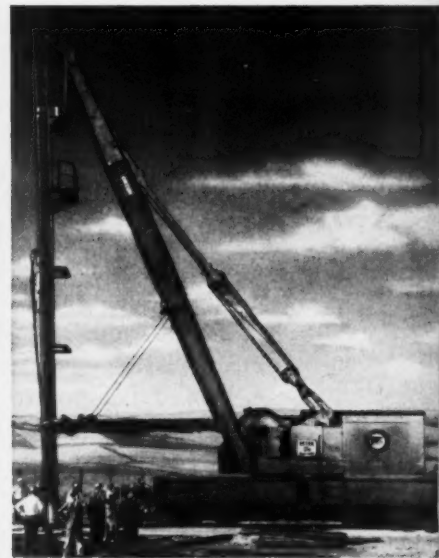
Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under this familiar symbol...

ORTON

the most **POWERFUL**
in CRANES...
PILE DRIVERS



An ORTON Pile Driver built to specification hoists, rotates, travels and operates the pile-driver leads, powered by a GM diesel engine with fluid torque converter. Self propelled at 24 mph on level track. Easily negotiates 5% grade; pulls 10 loaded cars weighing 70 tons on level—or 1 such car on 4% grade. Hydraulic pumps and auger attachments. Ask for catalog No. 90.



An ORTON Combination PILE DRIVER, 160-ton DIESEL WRECKER and BRIDGE DERRICK built to specification. Pendent pile driver leads permit batter in both directions. Can be equipped for use with air or diesel-operated hammer. Above: in use as a pile driver; large photo at left: same machine as a wrecker. Ask for catalog No. 89.

ORTON cranes operate on STRAIGHT DIESEL POWER. This enables ORTON to give 10-year guarantee on travel gears without limitation due to accident, derailment, misuse or other cause. Idles at 600 rpm instead of 1800; reduces engine wear immensely; reduces fuel consumption to about 3/4 of diesel electric operation. No danger of setting fire to combustible material on road beds. Moisture—even flood waters, won't immobilize an ORTON straight diesel machine.

ORTON CRANE & SHOVEL CO., 608 S. Dearborn St., Chicago 5, Ill.

KOPPERS

announces a new member of its
famous family of BITUMASTIC® coatings:

KOPPERS NO.99 INSULATING COATING

for applications requiring both

CORROSION PROTECTION *and* **INSULATION!**

WHAT KOPPERS NO. 99 IS: Koppers No. 99 Insulating Coating is a black mastic impregnated with cork. It was created especially for use where equipment requires both corrosion protection *and* insulation, and where potential savings in heat loss are not enough to justify expensive block-type insulation.

WHAT KOPPERS NO. 99 DOES: One application of Koppers No. 99 not only protects metal surfaces against corrosion, but at the same time furnishes effective thermal insulation. It also waterproofs, controls condensation, and deadens sound. It is resistant to acids and alkalis, and retains full efficiency through the temperature range from 250F to -40F. It may be applied winter or summer, indoors or out. It dries rapidly, is highly resistant to fire when dry, and may be painted if desired. It can be used on ceilings, partitions, air ducts, tanks, and many other surfaces.

WHY KOPPERS NO. 99 IS EASY TO USE:

Koppers No. 99 Insulating Coating requires no surface priming except under unusual conditions. Uniform coatings of the desired thickness may be sprayed on in a single application, using any one of several standard types of heavy-duty spray equipment.

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MONEY: If you have equipment or surfaces requiring both corrosion protection *and* insulation, Koppers No. 99 can save you money two ways. First: it effectively performs *both* functions with only *one* investment in materials and application. And second: because this coating is *long lasting* it *costs less per year* than any other method of providing the same protection. For specifications and applications data, write: Tar Products Division, Koppers Company, Inc., Dept. 116 E Koppers Building, Pittsburgh 19, Pa.



ONLY KOPPERS PROVIDES

BITUMASTIC

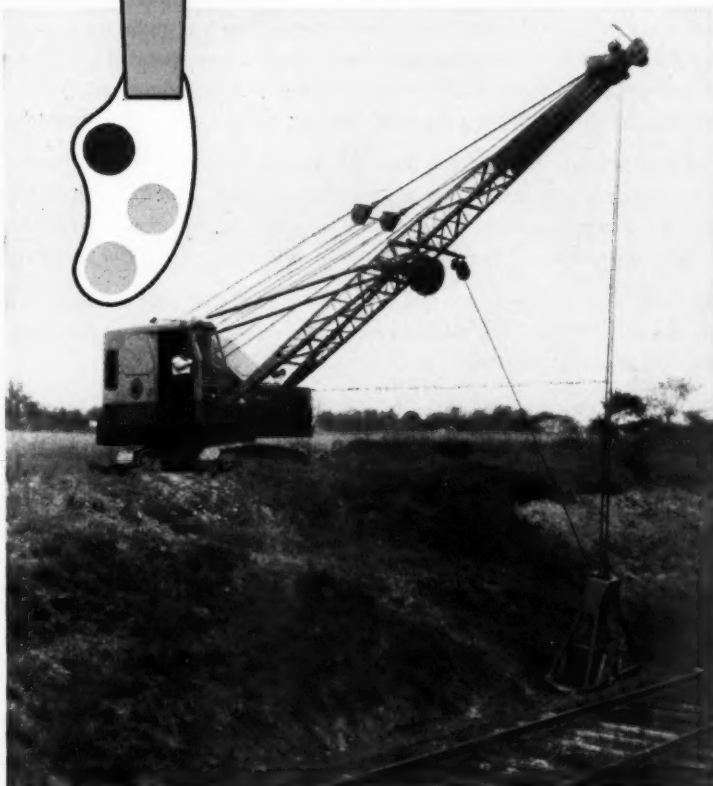
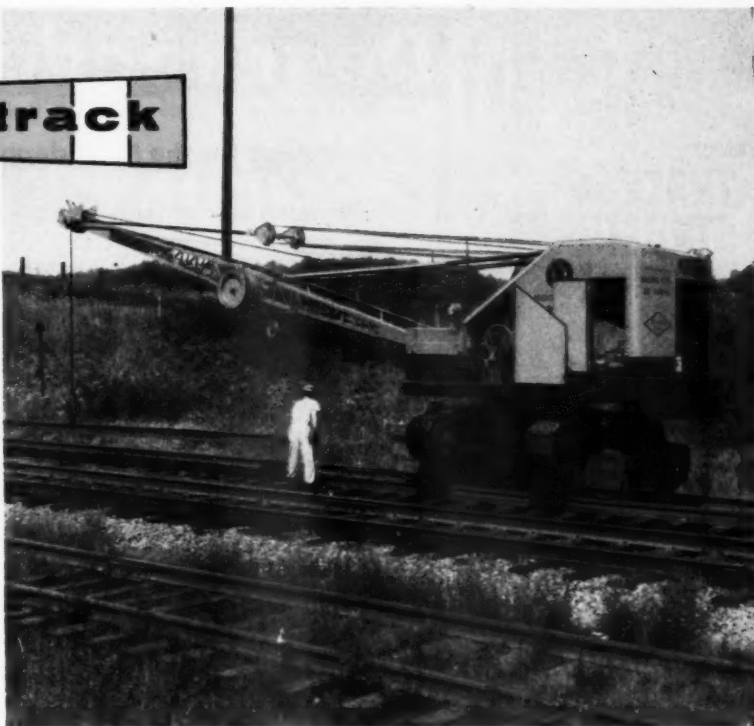
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Koehring 205 RailAid powers its own rail car. It travels on-track from one work section to the next at speeds up to 20 m.p.h. — works on or off-car with all standard excavator or crane attachments. You can send it anywhere along the line or in yards at a moment's notice to do any digging, lifting or material-handling. Does 2 to 3 times the work of ordinary excavators or cranes that have to crawl or be hauled from job to job. Propulsion car has 2-axle drive, with airbrakes on all 4 standard-flange wheels. Torque converter gives smooth control of travel speeds. Car-well accommodates 16, 20 or 24-inch crawlers on the heavy-duty excavator or crane.



In less than 10 minutes, Koehring 205 loads or unloads itself on the ramp equipped propulsion car. Crane or excavator sets the car on or off-track, clears the right-of-way for normal traffic. Work of the 205 and road crew is uninterrupted during the entire shift. This on and off-track flexibility is combined with big work capacity. As a crane, the heavy-duty 205 safely lifts 6.9 tons from the car — 8.9 tons on the ground. It readily converts to clamshell, dragline, pile-driver, ½-yard shovel or hoe. This versatile 205 RailAid is widely used by many of the country's leading railroads (names available on request). Better get all the facts on what it can do for you.

SAVES TIME ON ALL THESE JOBS:

Ditching	Repairing trestles
Rail laying	Erecting bridges
Stockpiling	Setting steel
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Wrecking	Storing parts
Salvage	Handling:
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Clearing slides	ballast, ash,
Widening banks	coal, scrap

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K657

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KOEHRING COMPANY, Milwaukee 16, Wis.
Subsidiaries: PARSONS • KWI-MIX • JOHNSON

RAILWAY

TRACK and STRUCTURES

Dear reader:

'Fair deal' for the M/W department

Wouldn't it be wonderful if maintenance-of-way departments could function in a completely independent fashion? What a difference it would make if they could plan their programs and always carry them out as planned, if they could do their work without worrying about traffic interruptions, and if they could buy equipment and materials in the quantities and at the times needed!

This is a pleasant dream, but it's still just a dream. The hard fact of life is that the maintenance department, which spends money but doesn't produce any revenue, is in a weak position in its dealings with management or with other departments. Maintenance officers can ask for what they want but they have no way of enforcing their demands. Yet on some roads the maintenance people have chalked up a pretty good record of success in winning concessions for themselves.

Take, for example, the matter of getting the operating department to cooperate in making tracks available to the maintenance forces. On some roads the operating people have been won over to a high degree of cooperation. They are willing to "detour" trains, to bunch them, and even occasionally to schedule freights at night, just to give maintenance gangs more on-track time. On the other hand, there are roads on which the needs of the track people are still pretty much ignored by the transportation department.

Then there's the matter of "stop and go" maintenance. The practice of cutting the cloth of maintenance allotments to fit the pattern of current traffic fluctuations still rules on some roads. On others, however, maintenance operations are programmed and scheduled for the entire year with the understanding that, barring a really severe slump in business, the work will be carried out as programmed.

Other examples could be cited but these are sufficient to make the point that maintenance departments seem to "rate" higher on some roads than on others. Why does this disparity exist? We can't be categorical about answering this question; there are too many variables. But at least we can do some speculating.

We can start with the premise that it is the attitude of management that determines the extent to which a maintenance department will get the things and the treatment it feels are necessary.

But what determines the attitude of management? For one thing, if the top executives have a background of experience in maintenance work it is logical to expect that they will have a more sympathetic attitude toward the problems of that department.

But this fortunate situation occurs all too rarely. Anyway, we have observed that frequently the roads on which the maintenance department gets the best treatment are headed by men with no experience whatever in the maintenance field. Somehow they have become convinced that a "fair deal" for the maintenance department will benefit the road as a whole.

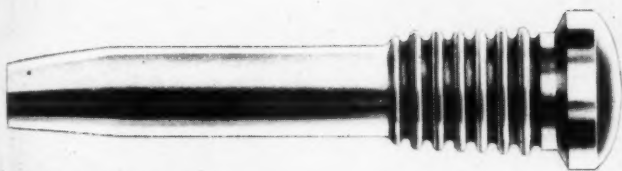
Could they have arrived at this conclusion on the basis of their own thinking and experience? Perhaps. The chances are, however, that they have been "sold" on the idea by the maintenance people. The latter have logic on their side, and this, combined with persuasion and perseverance, should eventually turn the tide in their favor.

MHD

ALL ALONG THE LINE...

THIS RACOR TEAM EXTENDS TIE LIFE

...REDUCES SPIKING COSTS



THE RACOR STUD (Patented)

Securely driven becomes integral with tie plate and restricts lateral movement effectively. This adds up to greatly reduced tie abrasion, a reduction of spike killed ties and a minimum of tie splitting. In addition to this extension of tie life, Racor studs pay off handsomely in reduced track maintenance. Because these sturdy anchor studs maintain better line and gage, they defer tie replacement, and they reduce labor costs. Many tests have shown a reduction of 50% in tie wear. Put Racor studs to work on your road. They'll pay big dividends all along the line.

THE RACOR DUAL DRIVER DD-4

(Patent applied for)

The DD-4 will drive Racor studs in the anchor position of tie plates and will effect substantial savings in line spiking costs. Studs or spikes are distributed in tie plate holes by hand. The DD-4 drives two studs or spikes simultaneously, then resets automatically for the next two. It has the advantage of two powerful pneumatic hammers, yet one man can drive twice as many studs or spikes without relief or fatigue. Take advantage of these time and cost-saving benefits. The DD-4 will prove well worth your while all along the line.

Write today for prices and complete descriptive literature.



AMERICAN
Brake Shoe
COMPANY

RAILROAD PRODUCTS DIVISION

230 PARK AVENUE, NEW YORK 17, NEW YORK



**"Funny? Why the boss man couldn't believe his eyes . . .
no brush, no weeds . . .
how does Bogle do it?"**

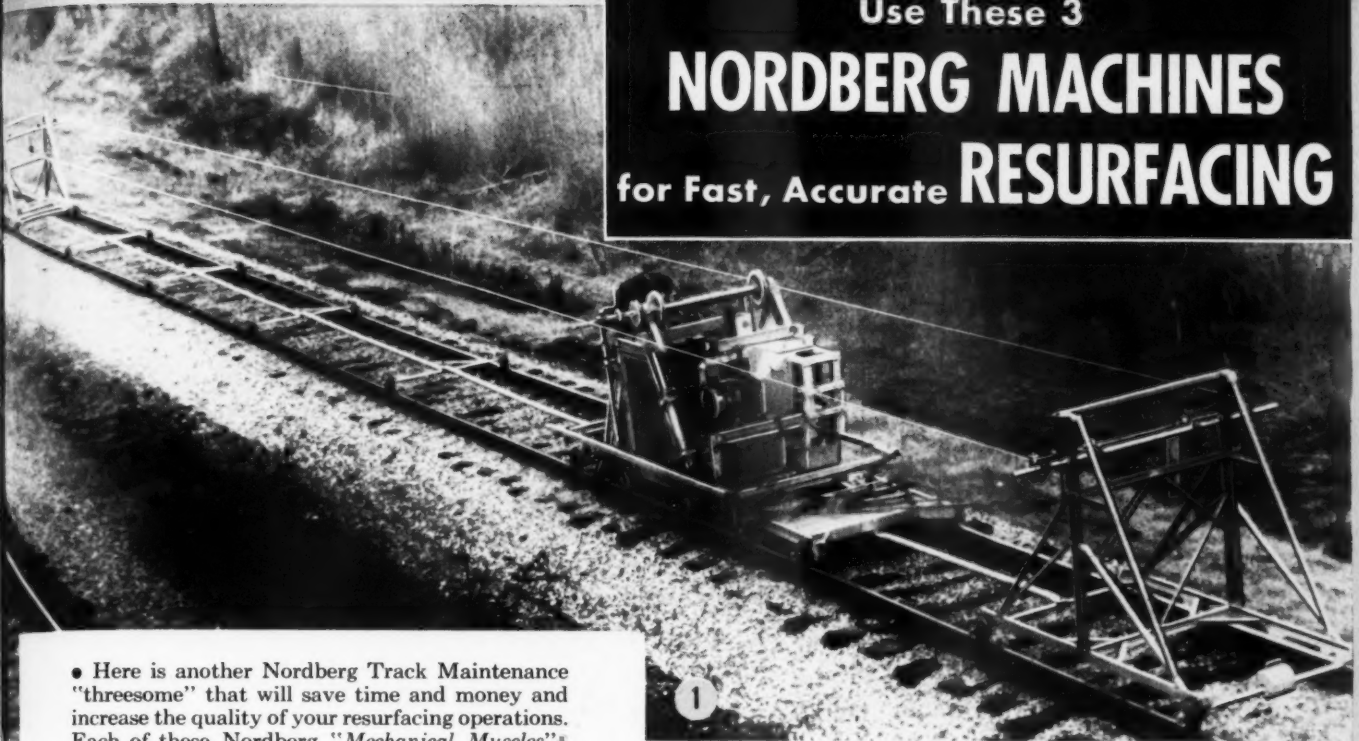
Magic? No. Just a matter of knowing the correct chemicals, and having the men, machines and experience to apply them properly. Our continuous "on-track" research proves what chemicals are best suited for each specific situation. And our highly trained personnel man the finest specially engineered equipment. The results are easy on the eyes . . . and the pocketbook. Why not let us map out a program for your road?



The R. H. Bogle Company

ALEXANDRIA, VIRGINIA
Memphis, Tennessee

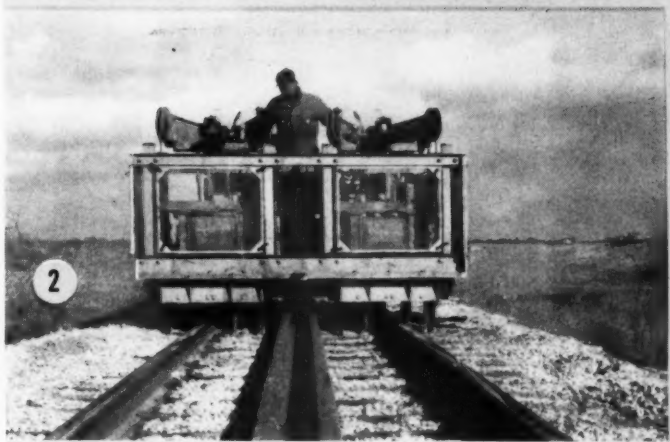
Use These 3
NORDBERG MACHINES
 for Fast, Accurate **RESURFACING**



● Here is another Nordberg Track Maintenance "threesome" that will save time and money and increase the quality of your resurfacing operations. Each of these Nordberg "Mechanical Muscles"® is ruggedly built to do a specific job . . . and do it better, faster and at lower cost. Proved cost savings will soon write off your original equipment investment on each of these machines.

1 TRAK-SURFACER—TAMPING POWER JACK TEAM

The Nordberg Trak-Surfacer is an entirely new method of producing improved profile and surface that has proved its speed and accuracy on a number of the Nation's major railroads. The Trak-Surfacer employs a tightly drawn wire as a reference line for raising the Grade Rail. A Nordberg Tamping Power Jack, used as the central unit, raises the track to the wire, tamps the tie to hold the raise and provides propulsion power for itself and the entire Trak-Surfacer.

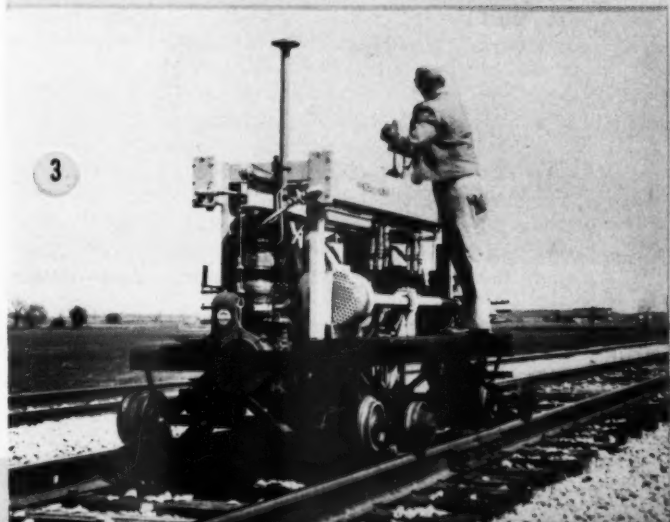


AUTOMATIC GANG TAMPER

- 2** Sixteen point tamping for raising or spot surfacing, this one-man machine tamps by impact, compression and vibration, with split tamping heads that tamp under one rail or both, as desired. Assures uniform quality tamping of every tie, every time, in any ballast. Has selective automatic or manual tamping cycle.

NORDBERG TRAKLINER®

- 3** The track lining machine with two point rail contact for extremely accurate, kink-free line. Operated by one man and self-propelled, the Trakliner is faster and more accurate than any other lining methods.



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R357

NORDBERG MFG. CO.
 Milwaukee, Wisconsin



NORDBERG
Mechanical Muscles®





Two **NEW** International **BIG BONUS**

with fast-loading, dirt-heaping, clean-

Now...all the advantages of famous International scraper design are available in two new towed scrapers—to turn big International crawler power and traction into *big-bonus yardage*. The new 20 cu yd heaped 4S-85 is matched in weight and capacity with the giant TD-24 to pile up profits on the fill. The 14-yard heaped 4S-55 is a cycle-speeder behind TD-18 heavy-duty pull!

Turn on International crawler power with one of these new scrapers—and watch the dirt boil in freely—compact itself into corners—build up an extra-yardage heap. These new scrapers have *flush-smooth* bowl interiors for *flow-easy* dirt action. You've never seen such fast, easy, big scraper loading! And outside-

mounted apron arms insure super-speedy, load-trapping apron action!

Ground-hugging profile and low draft arm connections give these new International scrapers an amazing new load-heaping line of draft—plus greatly increased *all-speed* stability for rough-terrain hauling! Roll-out ejection assures fast dumping, and positive discharge of wet, sticky material!

Prove bonus-powered International equipment performance for reducing grades, removing landslides, daylighting curves, handling ties, loading ballast—for all kinds of off-track duties. See your nearby International Construction Equipment Distributor for a demonstration.



INTERNATIONAL[®] Construction Equipment

International Harvester Company, 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Side Boom Tractors... Self-Propelled Scrapers and Bottom Dumps... Crawler and Rubber-Tired Loaders... Off-Highway Trucks... Diesel and Carbureted Engines... Motor Trucks

BRIEF

Re
Model T

4S85

4S55

Control
by posi
lift apr
sheave
axles of
placeab
pense! B



New fast-loading bowl design is obtained with a low rear apron contour that gives positive, built-in dirt-boiling action under all loading conditions. Even the wearbars protecting tilting floor hinge are blended into cutting edge bed—to insure smooth dirt flow!

YARDAGE

Scrapers

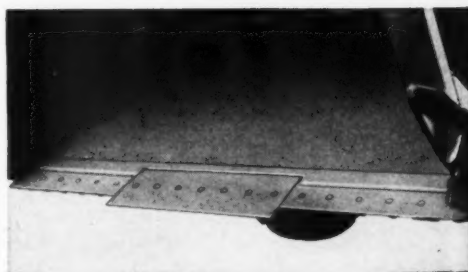
dumping design!

BRIEF SPECIFICATIONS:

Model	Recommended Tractor Size	Capacity Struck	Capacity Heaped	Capacity (with Sideboards) Struck	Capacity (with Sideboards) Heaped	Shipping Weight (Approx.)
4S85	TD-24	16	20	19	22	37,200
4S55	TD-18	10	14	12	15	26,360

Controlled, even spreading is accomplished by positive, power-saving roll-out ejection. High-lift apron, opened by ejector, eliminates excessive sheave travel and complicated reeving. All four axles of these new scrapers are individually replaceable, to minimize downtime, reduce repair expense! Below, the model "55" and TD-18 on the fill.

New cutting edge, where boiling action begins, consists of three equal-length, completely interchangeable and reversible sections. This design simplifies your parts inventory! And the cutting edge depth can be quickly changed to three different positions to match soil conditions and increase loading efficiency!



Exclusive power-saving double ball bearing sheaves maintain correct sheave alignment—provide increased cable and sheave life in these new scrapers. Below, it's the new 20-yard model "85" International scraper being self-loaded by a TD-24 crawler.



Armco Pipe-Arch Structures



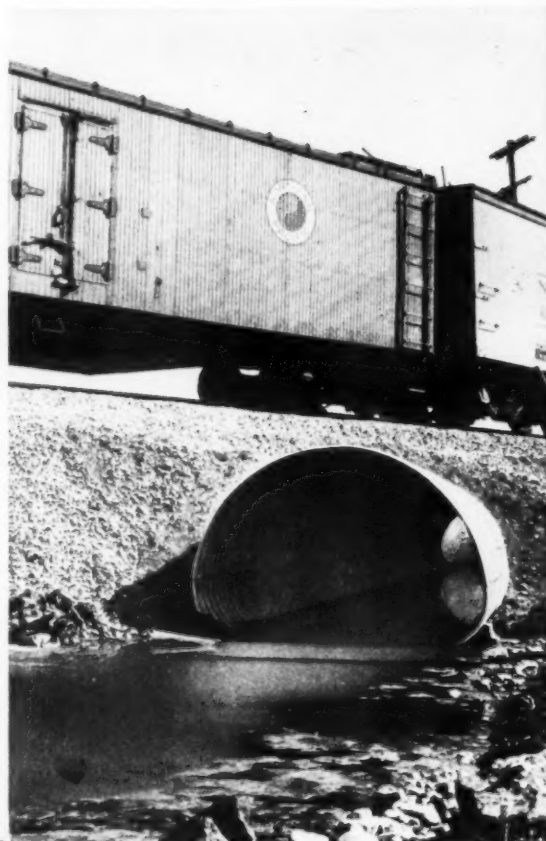
Solve Problems of Limited Headroom, Assure Safe Strength

Armco Pipe-Arch is made to order for limited headroom conditions. Under a shallow cover it provides the safe strength of corrugated metal design PLUS unrestricted waterway area to assure fast runoff.

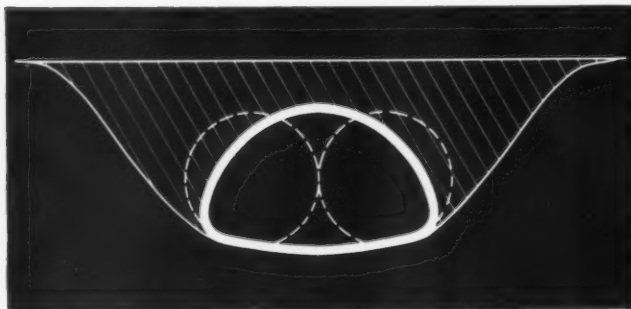
Shaped to "fit the ditch" with *extra area* in the bottom, Armco Pipe-Arch can save you time, trouble and money. For example, in many cases a single Pipe-Arch will do the work of two or more smaller openings. This means less installation time, less fill material, and less pipe to do the job.

Armco Pipe-Arches are a good long-term investment, too. They can always be extended, or fully salvaged and used in other locations.

Write us today for complete information about Armco Pipe-Arch and other drainage structures for railroad use. Armco Drainage & Metal Products, Inc., 4607 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.



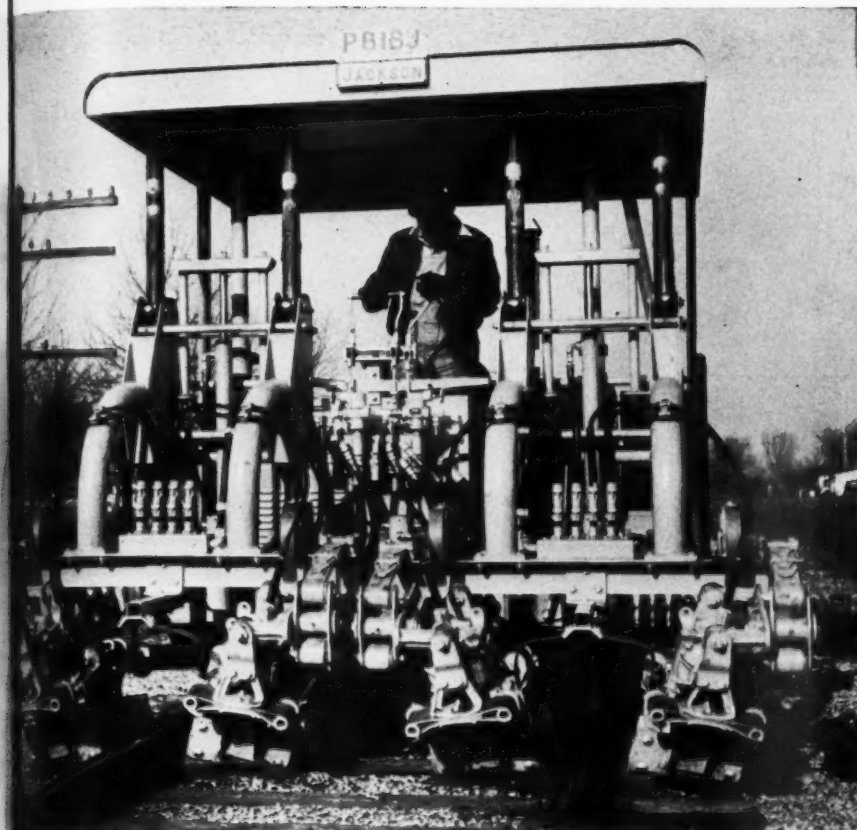
Installing an Armco Pipe-Arch eliminated the need for a costly trestle or masonry bridge.



When one Armco Pipe-Arch can do the job of two full-round pipes, handling, hauling and installation costs are cut in half.

ARMCO CORRUGATED METAL DRAINAGE STRUCTURES



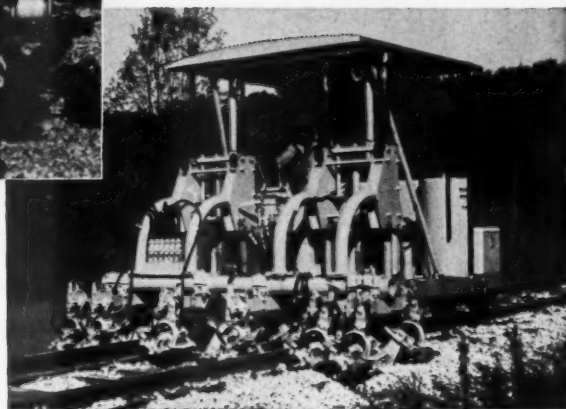


THE JACKSON TRACK MAINTAINER —
unmatched for both putting up and
maintaining track of finest quality
in an unlimited range of
conditions.

THE NEW JACKSON MULTIPLE,
relatively inexpensive on-track tamper
that's unrivalled for low cost and
uniformly fine tamping in all
operations involving medium to
high lifts or any lift equal to, or
greater than largest ballast used.

JACKSON MANUALLY GUIDED TIE TAMPERS.

These machines and the power plants
from which they are operated, are
exceedingly efficient, widely used by
small gangs in low lifts and smoothing
work, cross-overs and spots the
on-track machines can not reach.



From the shops of
JACKSON
tamping SPECIALISTS,
comes the best
answer to EVERY
TAMPING REQUIREMENT!

The very high regard in which Jackson Tampers are
universally held is the result of our many years of
specialization in the manufacture of this type of equip-
ment . . . over 35 years of continuous and intensive
study of the tamping needs of railways throughout
the nation and the devotion of all our energies to
the production of tampers which do the job better,
faster and more economically. Isn't it logical that the
best answer to YOUR tamping requirements should
be found here? It sure is, and we're confident we
can prove it to your entire satisfaction! We'll wel-
come the opportunity of conferring with you on any
tamping problem.

JACKSON VIBRATORS, INC. • LUDINGTON, MICHIGAN



Restore visibility to blind crossings with a new "crew" ... *Dow Brush and Weed Killers*

Blind crossings like this used to be quite common. Heavy growth of weeds and brush caused poor visibility for motorists at grade crossings—and often fostered fatal accidents.

But today the modern line can make its road safe and attractive with chemical vegetation control. Take the road-bed itself. Chemicals keep weeds from impeding drainage and causing haz-

ardous
do it
it's jus
tation
Fire,
as aut
your co
as wel
and ti
Preven



ardous footing for brakemen—and they do it at the least possible cost. And it's just as important to control vegetation along the entire right of way. Fire, a threat equally as dangerous as automobile accidents, can damage your communication poles and bridges, as well as neighboring fences, crops and timber.

Prevent these hazards the easy, eco-

nomical way with Baron*, Radapon* and other herbicides in the complete Dow line. Start programing a weed-free season now with your own "crew" of Dow brush and weed killers.

Professional applicators can help you save money. Their experienced, trained personnel know how to use the right chemicals at the right time. Their specialized equipment gives you more

mileage per gallon of chemical. Be sure to choose an applicator who uses Dow herbicides. That way you know he has the right tools for the job.

We'd like to send you more information and the name of a qualified Dow distributor. Write today to THE DOW CHEMICAL COMPANY, Midland, Michigan.

*Trademarks of The Dow Chemical Company

YOU CAN DEPEND ON



Matisa

TIE-RENEWAL MACHINE

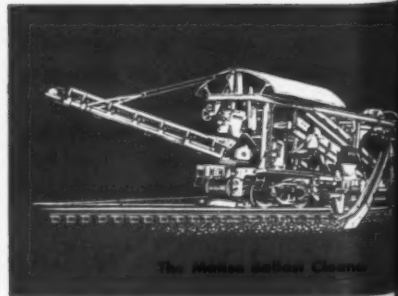
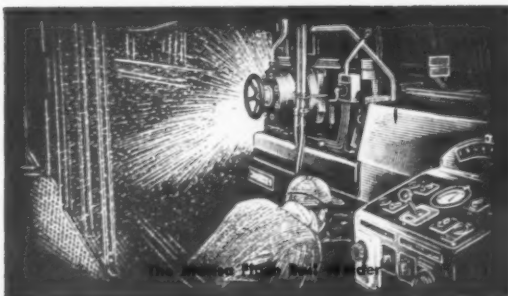
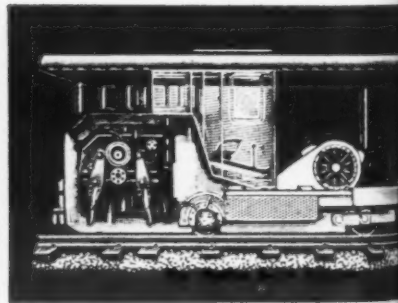
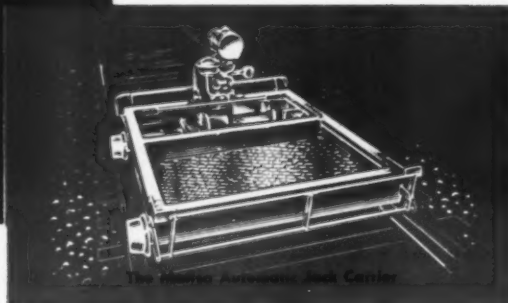


This one machine can give you double duty . . . rolling old ties out and new ones in at a high production rate and a commensurately low unit cost.

This versatility makes it economical either when used as a single all-purpose device by small gangs or when operated in multiple units with large production gangs.

Use Matisa Tie-Renewal Machines to cut tie installation costs and assure maximum production from your tamping machines.

Send for literature on this or other Matisa Machines illustrated below.



Matisa

EQUIPMENT CORPORATION
1020 WASHINGTON AVE. • CHICAGO HEIGHTS, ILLINOIS

RAIL

News notes...

... a résumé of current events throughout the railroad world

RAILWAY

TRACK and STRUCTURES

The United States Supreme Court has ruled that the federal government retained mineral rights to lands granted the Union Pacific for its right of way. The case involved an action brought by the government to enjoin the UP from drilling for oil and gas on the right of way granted to it by the land-grant act of July 1, 1862. The ruling applies to right of way lands only—not to the vast areas of other lands conveyed to railroads by the land-grant statutes.

Forty-two major railroads were charged with illegally monopolizing the commercial transportation of military personnel in a \$45 million triple-damage anti-trust suit filed recently by the Aircoach Transport Association. The complainant asked for an injunction against what it called "cut-throat" rate practices and other alleged actions of the railroads. It was stated that railroad rate practices in 1956 caused members of the association to lose \$1.6 million in Army business alone.

A new departure in piggyback has been announced by the New York Central. It involves the side-loading of demountable trailer bodies without cranes or other lift devices. A trailer to be loaded will be maneuvered onto a turntable mounted on flat car, which will then lift and rotate the trailer to the travel position. The trailer wheels will not be carried.

Loadings of revenue freight in the second quarter of 1957 will be approximately the same as in the like 1956 period, according to estimates of the 13 regional Shippers Advisory Boards. It is estimated that loadings of the 32 principal commodities in the current period will be 7,789,641 cars, compared with 7,758,785 cars in the second quarter of 1956. This would be an increase of 0.4 per cent.

The most recent contribution in the field of lightweight passenger equipment is a train consisting of six Budd RDC cars, modified for both diesel and third-rail operation, which the manufacturer has built for the New Haven. Known as the "Roger Williams," the train is designed to make a run of 206 miles in 2½ hours from suburban Boston to suburban New York.

Railway suppliers were told recently that the railroads may be forced to turn to foreign makers or increase their own manufacturing activities if the cost of railway supplies continues to spiral. The statement was made by Perry M. Shoemaker, president of the Lackawanna, in a speech before the New York Railroad Club. Pointing out that increased mechanization had saved the Lackawanna from bankruptcy, he urged the suppliers to adopt the most modern manufacturing techniques in an effort to cut costs.

In 1956, the nations' Class I railroads spent a total of \$1,883,848,000 for fuel, materials and supplies — an increase of 15.1 per cent over 1955's expenditure of \$1,647,075,000. Of the increase of approximately a quarter of a billion dollars, \$112 million was due to higher prices; about \$135 million represented an increase in quantities purchased.

BURRO CRANES

Handle Continuous
Rail From
End to End . . .

Speed Track Programs On Many Roads

The wider acceptance and increasing use of continuous welded rail has added another to the long list of jobs Burro Cranes are doing on the railroad today.

Track men learned at the outset, that these powerful, close-coupled railroad cranes could handle almost every phase of continuous rail operations from unloading rail at the welding site (above) to final positioning of the continuous rail. While most railroads use their Burro Cranes in the same manner for handling and laying the rail, maintenance-of-way men agree that the Burro is proving, once again, to be "the busiest and most efficient worker on the track." The powerful drawbar pull, excellent traction, and close-coupled design of Burro Cranes makes them ideal for the pulling, lifting and shifting required

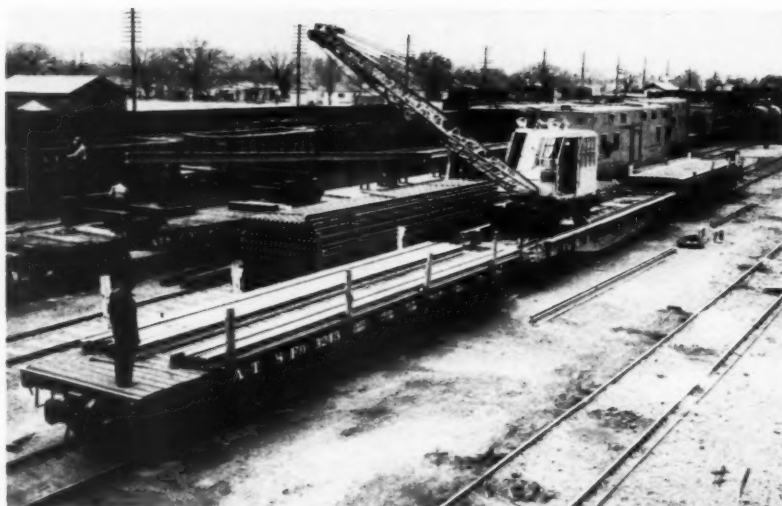


Fig. 1

in handling welded rail. Although different railroads have developed individual techniques in setting the welded rail into place, the basic job is to move the rail from the shoulder where it has been unloaded, and placed in laying position.

One of the most successful techniques observed by Cullen-Friestedt engineers is illustrated here. In Fig. 2, a Model 30 Burro is seen shifting the new rail from the shoulder to the center of the track. A threader, suspended from the boom of the crane, guides the rail as it is lifted from the shoulder by the Burro backing down the track.

After the rail is shifted to the center



Fig. 4



Fig. 3

of the track, the next operation, throwing out the old rail can also be handled by the Burro.

After ties are adzed and new tie plates are in place, the Burro moves

forward (Fig. 3) shifting the continuous rail from the center of the track onto the tie plates which have been properly guaged. General practice is to spike every fifth plate. A close-up view (Fig 4) shows the positioning of the rail on the tie plates. Burro Rail Tongs are used to handle the rail in this operation, as they permit better control as the rail is set to guage. Write for Model 30 Catalog — contains complete details, specifications and operating data. Sent without obligation.

CULLEN-FRIESTEDT CO.
1301 S. Kilbourn Avenue
Chicago 23, Ill.



Fig. 2

now, in rail tools, too, if it's Remington, it's right!

save time and
money with
ONE power unit

FOR SURFACE GRINDING • FROG GRINDING
• RAIL SLOTTING • SWITCH POINT
GRINDING • CROSS GRINDING • WIRE
BRUSHING • BOLT HOLE DRILLING



*Combination Rail Grinding Model 23 has
7 great features that make it right for you!*

- Powerful gasoline engine develops 8½ hp.
- Wheels insulated against interference with signal systems.
- Outriggers available to fit any gauge track.

- Entire unit rolls easily on track, allows machine to follow operator.
- Wheelbarrow mounting with pneumatic tire for easy mobility; can be moved off track by one man.
- Patented ball slip-lock connection for quick change of attachments.
- Pull-up crank starter for fast, kick-free starts in any weather.

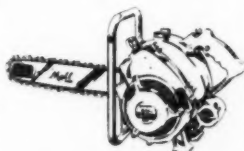
MODEL 23 Rail Grinder. Single-cylinder, 4 cycle, air-cooled gasoline engine. Horsepower ratings—6½ hp. at 2200 rpm.; 7½ hp. at 2700 rpm.; 8½ hp. at 3200 rpm. Welded tubular steel frame, 20" x 4" pneumatic wheel. L. 83", W. 30½", H. 34" 190 lbs. Includes outrigger, ¾" x 10' flexible shaft, 10' flexible shaft housing.

Remington

Mall
MALL TOOL COMPANY
Division of Remington Arms Company, Inc.
25000 S. Western Ave., Park Forest, Illinois



½" impact wrench specially
designed for railway work.



Gasoline, electric and pneumatic
chain saws for every requirement.

Specifications subject to change without notice.

Now! Cut maintenance costs!

Here is one of the most powerful, most versatile railroad maintenance machines ever designed! It is the product of 30 years' experience. Designed to cut maintenance costs, it has been tested and proved on America's leading railroads.

This famous Combination Rail Grinder, Model 23, is produced with the same quality and precision that have made Remington—the newest name in power tools—famous for 141 years in sporting firearms and ammunition. This Rail Grinder makes it possible for one man to do a wide variety of jobs with no time-consuming conversions necessary, because our patented ball slip-lock connection enables the operator to change attachments instantly. No threading to bother with.

For complete information about Remington's specialized Mall railroad tools, just send the convenient coupon below.

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Division of Remington Arms Company, Inc., Dept. E-39
25000 S. Western Ave., Park Forest, Illinois

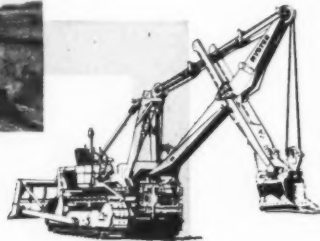
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HYSTAWAY[®] EXCAVATOR-CRANE TODAY'S MOST *Versatile* RAILWAY MAINTENANCE MACHINE



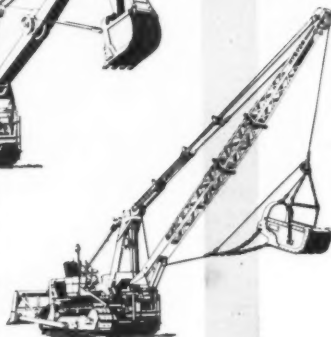
BACKHOE



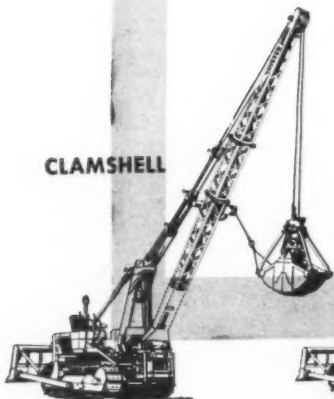
SHOVEL



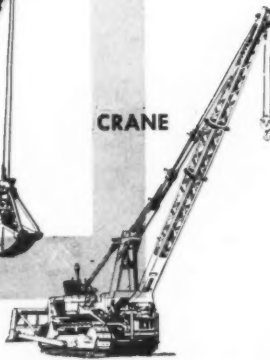
DRAGLINE



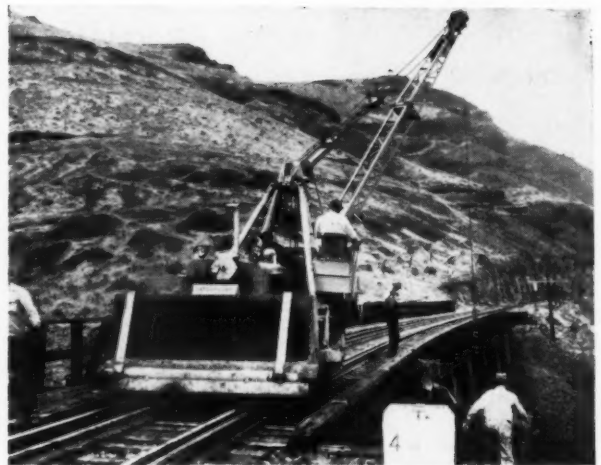
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CRANE



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HYSTAWAY, mounted on Caterpillar D8, D7 or D6 tractor, provides an all-purpose machine that can handle all these maintenance and construction jobs:

Loading and Unloading Rail
Laying Rail
Handling Construction
Materials
Handling Ballast
Lifting Equipment Off Track

or as a bulldozer—
Ditching and Filling
Grading, Clearing

These are only a few of the jobs that make Hystaway the ideal Right-of-way maintenance machine.

Exclusive **HYSTAWAY** advantages:

Complete Track-Type Tractor Mobility

Moves on or off track quickly; travels equally well on the track, or over rough ground.

No Tail Swing

Can work from inside gondola car in confined areas anywhere. 240° boom swing provides a wide working range.

Powered by Tractor Diesel Engine means faster, more efficient performance.

Conventional Lever-Bank Controls

Easy to operate from convenient adjustable operator's seat.

Converts Fast, for Other Types of Service

Optional Front End Equipment Gives you full-production — Shovel, Backhoe, Dragline, Clamshell or Crane.

Bulldozer

Ready at all times for light dozing. With the boom removed, it's ready for high production and heavy dozing jobs.

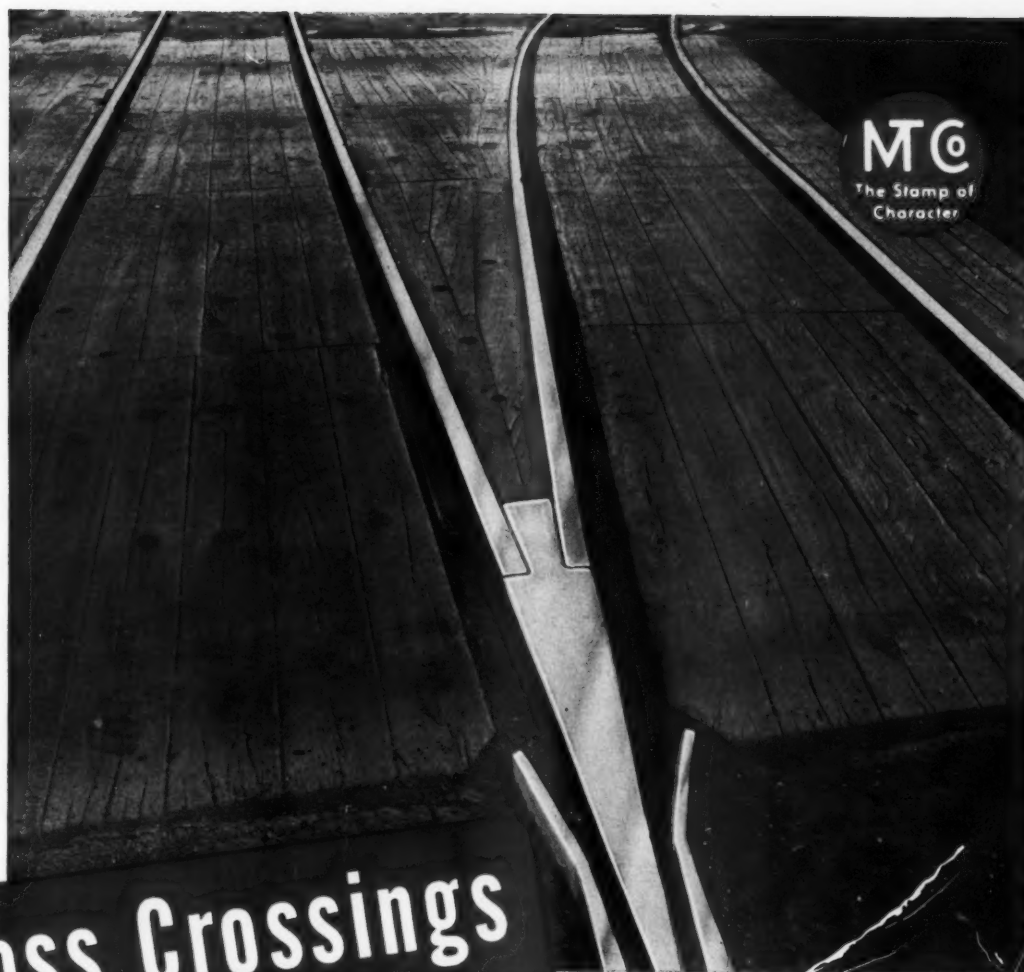
Ask your Caterpillar-Hyster Dealer for further details.

HYSTER COMPANY

**HYSTAWAY FOR RAILROAD
CONSTRUCTION AND MAINTENANCE**



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FACTORIES: Portland, Ore.; Danville, Ill.; Peoria, Ill.; Nijmegen, The Netherlands.



Moss Crossings

**win you handshakes . . .
rather than headaches!**

- Smooth, tightly-locked surface wins public applause.
- Interlocking grain of black gum, toughest of hardwoods, ruggedly resists battering wear and tear.
- Maintenance cut to a minimum through longer service, less patching and track tie-up.
- Highest quality pressure-cresoted timbers render exceptionally long life, safe service.
- Bolt-locked panel construction, quick and economical to install and easy to remove for track work.
- Tailored to fit any angle or curve.



Specify Moss Crossings of Pressure-Cresoted Black Gum. They stand the test of time.



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700 SECURITY BUILDING • ST. LOUIS 2, MISSOURI
CROSS TIES • SWITCH TIES • POLES AND POSTS • PILING • CROSSINGS
WOOD PRESERVING PLANTS: E. St. Louis, Ill.—Granville, Wis.—Shreveport, La.—Columbus, Miss.

RAILWAY TRACK and STRUCTURES

MAY, 1957 25

WANT HELP IN KEEPING ACCIDENT COSTS DOWN—

RIGHT-OF-WAY CREWS ON TARGET—AND ON TIME?



AJAX Drinking Water Service offers 3 BIG ADVANTAGES FOR TRACK MAINTENANCE GANGS

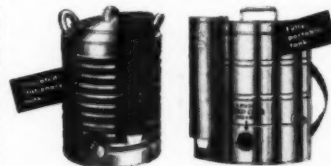
- 1** AJAX Cups and equipment provide the cleanest, safest and most time-saving way to take clean, fresh water to gangs working on the right-of-way.
- 2** Crisp, clean AJAX Cups reduce the risk of spreading infections, like the common cold, that cause lost days . . . and thus help you keep important maintenance work on schedule.
- 3** The safety messages imprinted on AJAX Cups (at no extra cost) provide frequent reminders that help prevent accidents — another source of lost time and extra costs.

AJAX Complete Drinking Water Service was developed out of long experience with railroad work. It is ideally suited to the needs of track maintenance work . . . actually works three ways to help you save time, maintain schedules, and cut operating costs.

WRITE TODAY for samples of imprinted AJAX Cups and new folder giving details of this complete drinking water service.



AJAX® CUPS — wedge-shaped, easy to hold—dispense open, ready to drink from; come in 4, 6 and 7 oz. sizes, imprinted with assorted stock safety messages at no extra cost — or your own message to order.



United States Envelope Company

General Offices: Springfield 2, Massachusetts

15 Divisions from Coast to Coast



A-W's live boom makes it the ideal tool for loading and unloading freight cars.

Here's the most versatile hoisting tool in industry... the A-W HYDRAULIC CRANE



Versatile A-W saves many costly hours of maintenance time.

Combining its unique pickup, carrying and placement capabilities with the best features of other types of cranes, the A-W Hydraulic Crane sets a new standard of performance. Take a look at some of the reasons why it does more jobs better than anything in its class:

Live boom action—The 18-ft. boom is under complete hydraulic control, responds instantly to the operator's touch with smooth, positive action. Rotates a full 360° if necessary. Can extend and lift a live 5-ton load while it pulls, moving forward or backward at the same time. Because it's powered both ways, up and down, you can't drop anything you're hoisting—an important safety feature.

Works indoors and out—Its sturdy, close-coupled chassis with all-wheel steer gives fast travel in and out of buildings and around obstacles. All-wheel drive and oversize tires take it through sand, across rough terrain, over rails with perfect ease. When the going is particularly tough, when storage areas are muddy or snowy, or there are ramps to climb or freight cars to push, all-wheel drive and the torque converter (optional) really do a job.

Easy, low-cost operation—Simplicity is the key-word for the entire operation of the A-W Crane, and anyone can easily learn to operate it in a very short time.

As for costs, this is the report of a typical user: "The daily machine cost

of \$11.11 is less than one hour's payroll of the six men this tool assists. With it, they are able to do a job in half the time. Very conservatively, our hydraulic crane is returning 100% a year on our investment."

Ask your nearby A-W distributor to tell you all about the time- and money-saving advantages of this remarkable machine. Or write direct to Austin-Western, Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Aurora, Illinois.

Write for Data Book 2253—full of facts on working ranges, boom extensions, minimum aisle widths, tractive effort, towing capacity, and special attachments.



Power Graders • Motor Sweepers • Road Rollers • Hydraulic Cranes



AUSTIN-WESTERN WORKS

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AURORA, ILLINOIS, U.S.A.

PRESENTING THE KAISER ALUMINUM DOUBLE-FACED CROSSBUCK

New insert panel permits identical warning message area on both sides

Here's a unique new extruded crossbuck design—exclusive with Kaiser Aluminum—with a removable insert feature permitting either single or double faced installation. When in place, this insert sheet provides a smooth, wide lettering surface on the back of the sign just as on the front, warning motorists from both directions.

Sturdier

With or without the insert, this crossbuck is so strong it will withstand winds of 100 miles per hour. Its secret: the high strength of Kaiser Aluminum's 6063-T6 alloy, plus the special 4-ribbed design of the sign itself. (Notice, also, how the outer ribs are placed to protect the leading edges, while the inner ribs are located close to bolt shanks to resist crushing when the nut is tightened.)

Saves you money 4 ways

1. Unlike other sign materials, aluminum can be *extruded*, permitting one-piece, reinforced construction for economical mass production.
2. The aluminum arm weighs only one-fourth as much as a steel arm, one-half as much as one of wood. This means easier handling by a minimum service crew... *plus* sharply reduced shipping charges.
3. Aluminum crossbucks won't rust, rot or warp, thus keeping maintenance and replacement costs to a minimum.
4. One Kaiser Aluminum crossbuck will do for either single- or double-faced installations—multiple stocks unnecessary.

Ideal mounting surface

Recommended for reflective materials such as "Scotchlite" brand reflective sheeting. Reflective sheeting is applied to the insert in the same easy manner as to the extrusion—no special hand application necessary. Also, excellent base for paint or reflective buttons.

For further information, contact your nearest Kaiser Aluminum Sales Office. Kaiser Aluminum & Chemical Sales, Inc., General Sales Office, Palmolive Bldg., Chicago 11, Illinois; Executive Office, Kaiser Bldg., Oakland 12, California.

Kaiser Aluminum

See "THE KAISER ALUMINUM HOUR." Alternate Tuesdays, NBC Network.
Consult your local TV listing.





Ease the strain of

**pounding
wheels!**

Install Improved Hipower
Spring Washers to ease the
stress and strain created by
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sorb shocks by equallizing bolt
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Hipowers are designed to pro-
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effectiveness, reducing main-
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with —

IMPROVED HIPOWERS

A COMPLETE LINE OF
RAILWAY SPRING WASHERS

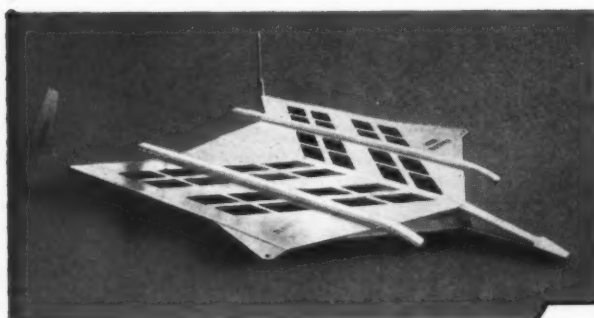


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Serving Industry Since 1886 — NEWARK 5, NEW JERSEY, U. S. A.

These Railroads have Proved you save Track Costs the patented MANNIX way!

- The Baltimore & Ohio
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- Central of Georgia
- The Chesapeake & Ohio
- Chicago and North Western
- Chicago, Burlington & Quincy
- Delaware & Hudson
- The Denver & Rio Grande Western
- Great Northern
- New York Central System
- Northern Pacific
- The Pennsylvania
- St. Louis Southwestern
- Southern Pacific Company
- The Texas & Pacific
- Ft. Worth & Denver
- Seaboard Air Line



Proven on the job by all these modern railroads . . . the Mannix Sled/Plow method can save money for you! Recent *Railway Track and Structures* articles give further proof of its cost-cutting efficiency on track maintenance and rehabilitation programs. Write for full details of the patented Mannix Sled and Plow . . . and the special rental plan available.



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All Leading
Railroads are
Buying . . .

WESTERN FORMERLY BUDA JACKS TO MAINTAIN TRACKS



Increasingly heavy traffic over mainlines that must be kept in fast condition places critical emphasis on improved track maintenance technique. This is where WESTERN TRACK JACKS are building a deserved reputation for *safe, fast, positive* action . . . the real reason for their booming popularity by all leading railroads.

Take the versatile, sturdy, dependable Model 715 shown

here. Like all WESTERN TRACK JACKS, its capacity is 15 tons. Its lifting range goes up to 13 inches, either from the wide cap or ample toe lift. Both pawls are held in close contact with the strong rack bar by super-heavy safety springs. "Tripping" is unusually fast and simple but, as a safety feature, requires definite, positive action to avoid accidental lowering of load.

For Bridge and Building Work

WESTERN's wide variety of Hydraulic Jacks (9- to 100-ton capacity), Ball Bearing Journal Jacks (15- to 50-ton capacity), All Purpose Screw Jacks (10- to 24-ton capacity), and Klinch Klaw Jack are rapidly gaining wider acceptance in the erection and maintenance of structures.

HYDRAULIC JACK

Model 25B22

Most complete line in "Hi-Speed" and "Two-Speed" models. Widest range in closed heights (8 to 26 inches) and lift ranges (4 to 22 inches).



ALL PURPOSE SCREW JACK

Extra heavy-duty bell bottom base. One-piece steel machine screw with forged steel head. Complete series of 23 models to choose from.



BALL BEARING JOURNAL JACK

Model 2510

Faster lifting ratio. Wider lift ranges (4 to 8 inches). Wider cap and base. Larger ram. No creeping or accidental lowering.



KLINCH KLAU

Model 225A
Aluminum Alloy Housing

Pulls all types of headed or headless bolts, spikes, rods. Pulls bolts between ties from 20 inches below the surface.



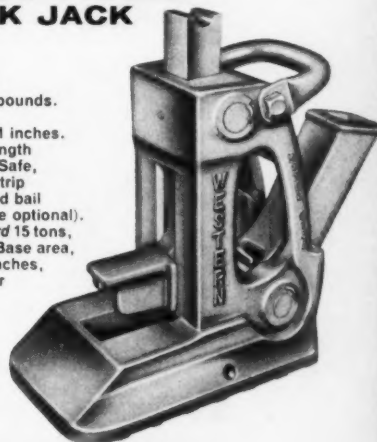
It's Here!

Model 514-A

ALUMINUM FRAME TRACK JACK

FEATURES

Weight, only 32 pounds. Lift, 5 inches. Closed height, 11 inches. Frame, high strength aluminum alloy. Safe, positive ratchet trip mechanism. Rigid bail handle (horn type optional). Capacity, *standard* 15 tons, on head or toe. Base area, over 66 square inches, heavily ribbed for sure footing.



Write for detailed information on the most complete jack line available anywhere.

WESTERN RAILROAD SUPPLY COMPANY

Maintenance-of-Way Division

2400-2434 South Ashland Avenue, Chicago 8, Illinois

CANADA: Melville Machinery Co., Ltd., 515 Bisson Street, Montreal 3, Quebec

One of a series of ads featuring new WESTERN products formerly supplied by BUDA

News about people

RAILROAD

BALTIMORE & OHIO—Charles E. Zeman, senior engineer at Baltimore, Md., has been appointed regional engineer of the B&O and the B&OCT at Chicago, succeeding John S. Knight, retired after 46 years of service.

BANGOR & AROOSTOOK—Cecil E. Garcelon, superintendent of track and work equipment at Houlton, Me., has been promoted to assistant to manager of operations at Bangor. Graden Swett, roadmaster, succeeds Mr. Garcelon, and Roland Tweedie, section foreman at North Bangor, has been named roadmaster at Oakfield, succeeding Mr. Swett.

CANADIAN NATIONAL—C. I. Biegler, operation trainee, Central Region, has been promoted to acting district engineer, succeeding W. E. Jackson, temporarily assigned to special duties.

CHICAGO & NORTH WESTERN—William H. Huffman, assistant engineer of maintenance, Chicago, has been promoted to assistant chief engineer, succeeding P. V. Thelander, retired after 41 years of service. Maurice S. Reid, assistant engineer of maintenance, has been promoted to engineer of maintenance, succeeding L. R. Lamport, who resigned at his own request after 37 years of service. Harold W. Jensen, assistant engineer of maintenance, has been appointed engineer of track, and John P. Dotesman, engineer of track, has been appointed to the new post of process engineer. James A. Barnes, assistant to chief engineer, has been promoted to assistant to engineer of maintenance, and E. L. Barnes, roadmaster at Norfolk, Neb., has been appointed assistant process engineer.

CHICAGO, ROCK ISLAND & PACIFIC—J. E. Freeman, steel bridge gang foreman, has been promoted to master carpenter with headquarters at Rock Island, Ill., succeeding R. B. Stone, who has been advanced to bridge and building supervisor at Des Moines, Iowa. Mr. Stone succeeds D. W. Isaacs, who has retired.

MISSOURI PACIFIC—W. I. Stadter has been appointed assistant superintendent of

maintenance of way equipment at St. Louis, succeeding F. E. Yockey, named superintendent of maintenance of way equipment, succeeding H. S. Craine, retired after 34 years of service.

NASHVILLE, CHATTANOOGA & ST. LOUIS—W. C. Love, principal assistant engineer, Nashville, Tenn., has resigned to enter private practice. He will be senior bridge designer with Capital Engineering Corporation and will be engaged on highway design in Vietnam.

NEW YORK CENTRAL—R. F. Lawson has been named district methods engineer. L. D. Cooper, has been appointed district materials engineer and F. A. Schneider has been named district equipment engineer—all at Indianapolis, Ind. J. A. Carey has been appointed assistant division engineer, Mohawk-Hudson division, Albany, N. Y., succeeding R. J. Hardenbergh, transferred to the Ohio Central division, with headquarters at Columbus, Ohio. G. S. Woodling, has been named division engineer, Buffalo division, at Buffalo, N. Y., succeeding B. J. Gordon, transferred. T. M. Scott, has been appointed assistant division engineer, Boston & Albany division, Boston, Mass., succeeding J. J. Connors, who has been promoted to division engineer at Mattoon, Ill., succeeding R. K. Pattison who has been named assistant superintendent of the Indiana division.

ST. LOUIS-SAN FRANCISCO—B. E. Buterbaugh has been appointed assistant superintendent of construction at Springfield, Mo., and R. N. Schmidt has been appointed assistant division engineer at Ft. Scott, Kan.

SEABOARD AIR LINE—J. W. Martin, assistant master carpenter, South Florida division, has been promoted to master carpenter succeeding L. M. Hartley, retired, after 36 years of service. J. H. Abbott, assistant roadmaster at Savannah, Ga., has been promoted to roadmaster for the Waldo-Brooksville-Tampa district.

SOO LINE—R. C. Postels, division engineer, Minneapolis and Duluth division, Superior, Wis., has been transferred to the Minnesota division, Enderlin, N. D., succeeding E. M. Northenscald, retired. B. R. Prusak, division engineer, Gladstone divi-

sion, Gladstone, Mich., succeeds Mr. Postels and is replaced in turn by A. G. Smith, who has been transferred from the Winnipeg division, Thief River Falls, Minn. P. J. Isakson succeeds Mr. Smith.

SOUTHERN PACIFIC—Frank V. Leavitt has been appointed general supervisor welding at San Francisco, succeeding A. E. Wainscott, retired.

OBITUARY

E. J. Andrews, retired architectural engineer, New York Central, died recently.

SUPPLIERS

CHICAGO PNEUMATIC TOOL COMPANY—E. S. Rosselle has been appointed assistant sales manager of the Railroad Division with headquarters at Philadelphia. He is being transferred from the company's Chicago district. Mr. Rosselle will supervise railroad sales in the Eastern District. H. R. Deubel, Chicago, continues as manager of the entire division. J. R. Ludwig has been appointed to the railroad division sales staff, and will work in the Chicago area.

EASTERN RAILWAY SUPPLIES, INC.—W. H. Bahrenburg, Jr., former supervisor of track, Reading, has been appointed sales representative at New York.

INTERNATIONAL HARVESTER COMPANY—Warren H. Thompson, assistant general supervisor in the sales development section, Construction Equipment Division, has been promoted to general supervisor.

Biographical briefs

Joseph M. Emmons, 26, recently appointed track supervisor on the Denver & Rio Grande Western at Grand Junction, Colo. (RT&S, March, p. 98), graduated from the University of Idaho in 1951 and entered railway service with the Rock Island as rodman. He served the Missouri Pacific in 1954 as an instrumentman and in October 1955 joined the D&RGW as an engineering assistant.

Clarence E. Jackman, 49, recently appointed assistant chief engineer maintenance of the Baltimore & Ohio, at Baltimore, Md. (RT&S, Mar., p. 96), graduated from Purdue University and joined the B&O in 1940 as a blueprinter at Cincinnati, Ohio. He subsequently served as assistant engineer at Cincinnati, assistant division engineer at Newark and at Connellsville, Pa. In 1950 he was named division engineer at Newark and two years later was transferred to Cincinnati. After serv-



William H. Huffman
C&NW



Maurice S. Reid
C&NW

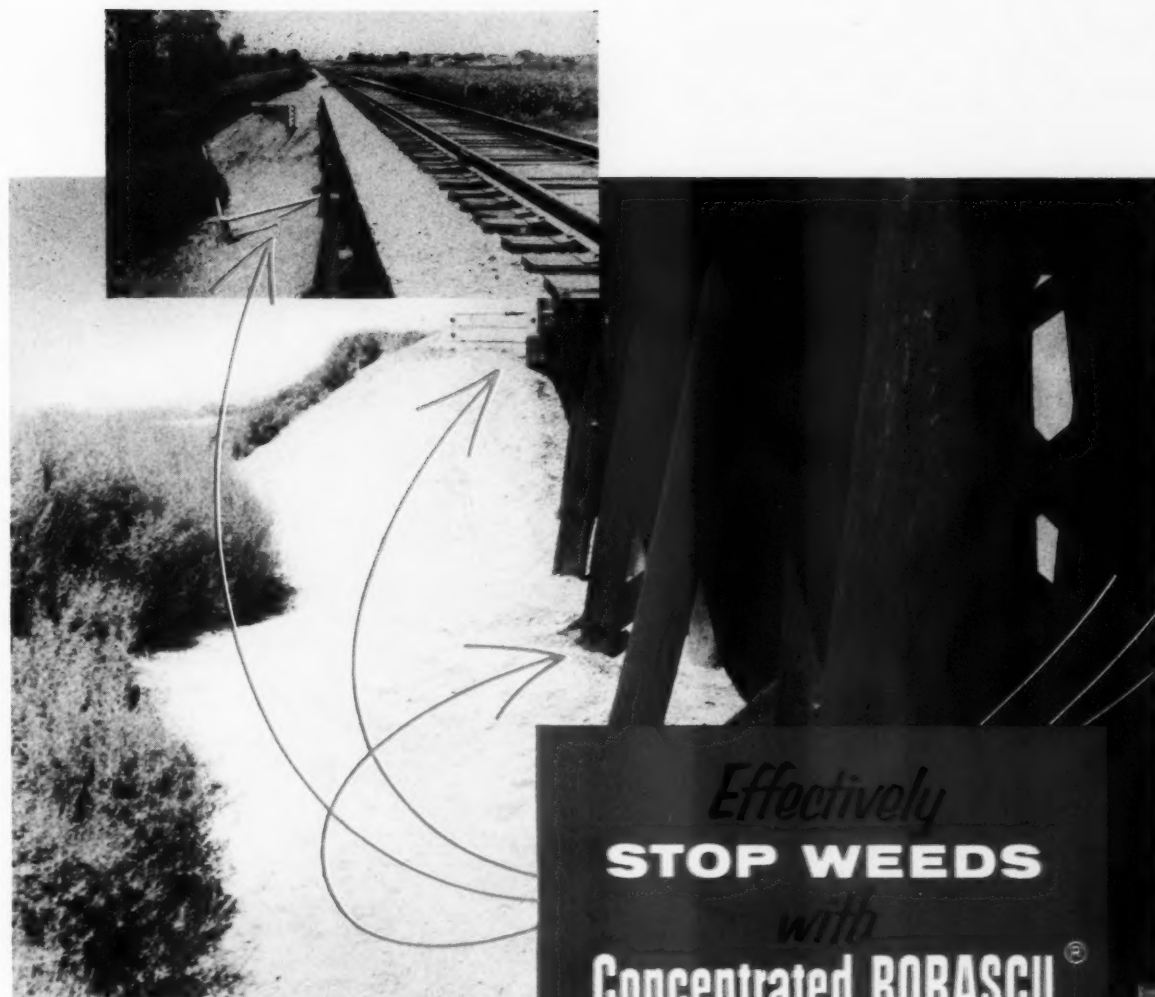


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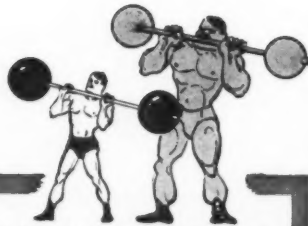
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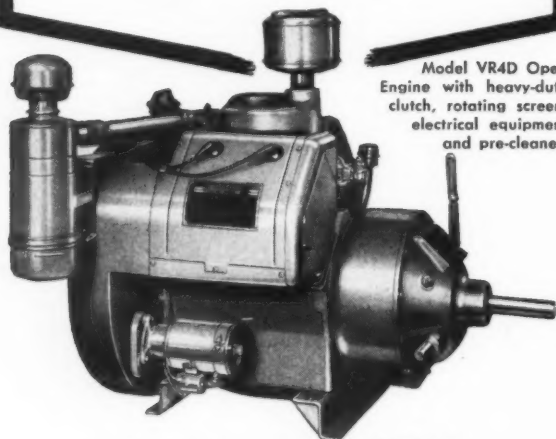
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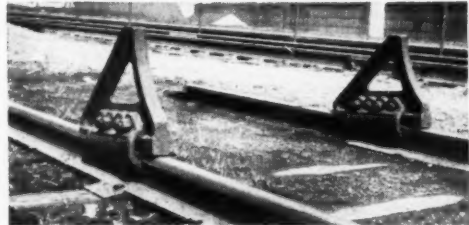


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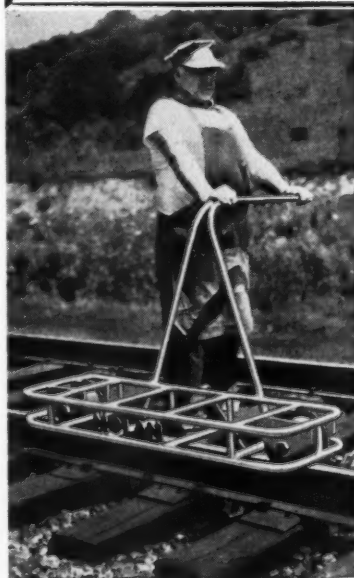
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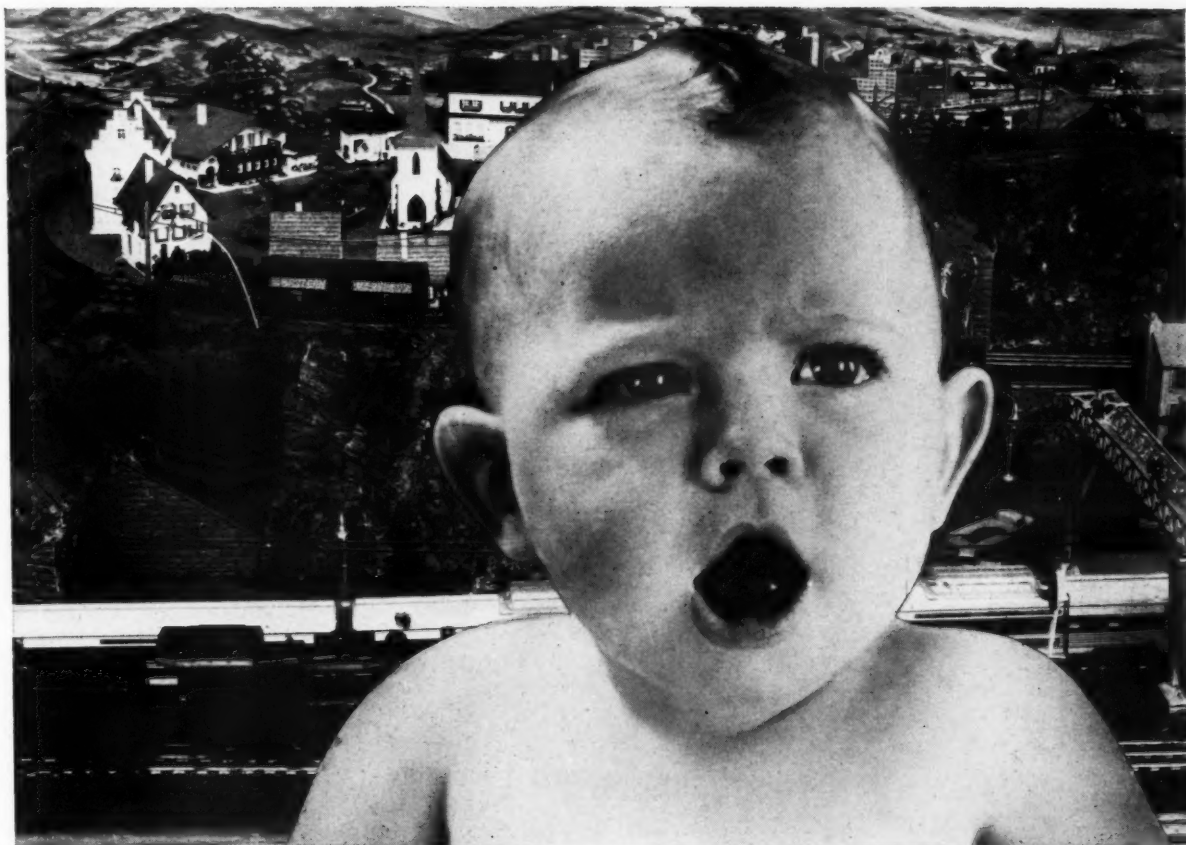
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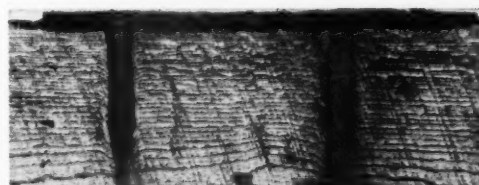
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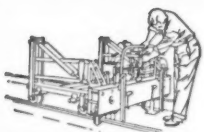
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AREA panel talks about

TIES -- Their use in track

What and where:

This feature of the AREA convention took place on March 6, the last day of the association's convention, held at the Sheraton-Jefferson hotel, St. Louis, Mo. It was sponsored by the Committee on Ties.

The panelists expressed their ideas freely about such matters as cycle renewals, tie coatings, the effectiveness of anti-splitting devices, marking of ties, pre-boring, tie pads and plate-cutting.

Who was on the panel:



- L. C. Collister (moderator), manager tie and timber treating dept., Santa Fe System, Topeka, Kan.
- L. P. Drew, assistant chief engineer, Union Pacific, Omaha, Neb.
- W. E. Fuhr, division engineer, Milwaukee Road, Savanna, Ill.
- L. E. Gingerich, assistant chief engineer—maintenance, Pennsylvania, Philadelphia
- M. J. Hubbard, assistant chief engineer—system, Chesapeake & Ohio, Huntington, W. Va.
- R. B. Radkey, engineer ties and treatment, Illinois Central, Chicago

◀ L. C. Collister, moderator

Photos of other panelists ▶

What About Cycle Renewals?

Collister: *Mr. Drew, when tie renewals are made by heavy maintenance gangs, should this be done on the basis of renewing all ties which will not last until the next renewal cycle?*

Drew: This is a question that can be answered only by determining the period of a cycle. If the cycle is short—say, three to five years—it is usually most economical to remove all ties which will not last that period. However, if your cycle is longer, then it is sometimes not advisable to remove ties which have from 8 to 10 years' service life still remaining.

Collister: *Mr. Gingerich, should ties be renewed in cycles, or by what is known as spot renewal?*

Gingerich: I think there is an economical and a proper use for both methods. If your volume of traffic is such that a track must be given an out-of-face working and a raise, say, every four to six years, it is entirely proper and economical to renew all ties in the track that will not give

reasonably adequate support until the next out-of-face working.

Where the cycle period between out-of-face working and raises is greater, say 7 to 8 years, it wouldn't be economical or proper to renew ties that will not give satisfactory service until the next working. In that case, I would say the proper method is to make spot renewals.

Use of Tie Coatings

Collister: *The association has just adopted a specification for coating of crossties. I would like to ask Bob Radkey this question: When do you believe it will become practical to adopt coating of ties as standard practice?*

Radkey: Coating ties will become standard practice when we are convinced that the benefits will justify the cost. At present, coating is primarily a hand labor job, with a relatively short coating life as compared to the total tie life. Right now there is reasonable justification for coating expensive bridge timber, but the economy of crosstie coating is yet obscure.

TIES—Their use in track

Tie coating could quickly become standard practice with the development of one of three things: First, a process of applying the coating in the treating cylinder, whereby the ties are delivered to the point of use completely equipped with the coating (encasement in a plastic shell might be an answer); second, an on-track machine which would apply the coating, out of face, to all track ties, at a speed of 5 to 15 mph and require no individual hand labor; third, the development of a coating which would have an effective life of 20 years. Costs would have to be within reason with each of the foregoing.

Collister: *Mr. Hubbard, why do not railroads adopt the practice of coating ties with some plastic materials to reduce splitting and decay?*

Hubbard: I think I would answer that, in general, it would be for economic reasons.

If sterilized ties could be economically coated with a plastic coating that would not be broken and exposed to weather conditions, preservative treatment would not be necessary for an indefinite life. This is not possible, as preservative treatment is necessary to prevent decay, and to date there does not seem to be an economical plastic coating to cover treated ties that will add very much to the service life of a well-treated tie. Any heavy plastic coating on tops of ties that are exposed to the direct sun rays will definitely reduce checking and splitting. The extent of checking and splitting of the particular species of wood will to some extent determine the value of the coating.

Collister: *Mr. Gingerich, how do various anti-splitting devices compare in effectiveness in tie service?*

Gingerich: It has been our experience that the old S and C irons give satisfactory service during the seasoning period, but after ties are placed in track, we find in about five years that a considerable number of the S and C irons have either fallen or rusted out, and are no longer effective. After about ten years in track, they are practically all out, with no continued benefit insofar as splitting is concerned.

On the other hand, ties in which dowels have been installed are not so affected. We find that after ten years in track, the dowels are in good condition, with every indication of considerably more life. We also feel that they have retarded the splitting of ties during their service life, and that is an important factor in heavy-tonnage territory, particularly where you have heavy grades and curvature.

Collister: *Mr. Fuhr, in hardwood ties protected by tie plates, is plate cutting ever the sole cause for renewal?*

Fuhr: Yes, according to the report of our committee on Assignment 7—Causes Leading to the Removal of Crossties, replies received from five leading railroads show that 9.4 per cent of the 2500 oak ties inspected in 1956 were removed because of tie-plate cutting.

Collister: *Mr. Drew, when should a tie be renewed because of plate cutting?*

Drew: This depends to some extent on the species and the amount of traffic. Most plate-cut hardwood ties—and a good many softwood—can be left in track, so long as the depth of the plate cutting does not exceed from 1½ to 2 in. Beyond that point, unless you have a very good ballast support, the bearing under the rail is not sufficient to handle the load.



L. P. Drew and L. E. Gingerich

Remarks at Random . . .

"Most plate-cut hardwood ties—and a good many softwood—can be left in track, so long as the depth of the plate cutting does not exceed from 1½ to 2 in."—L. P. Drew

"We also feel that they (dowels) have retarded the splitting of ties during their service life, and that is an important factor in heavy-tonnage territory."—L. E. Gingerich

"The marking of ties to be removed from track at

Who Should Mark Ties?

Collister: *Mr. Radkey, who should inspect and mark ties prior to renewal?*

Radkey: The title of the person doing this work is relatively unimportant. He should be familiar with track maintenance work to understand what is needed from a cross-tie. He must have sufficient timber knowledge to distinguish between damaging and minor defects. He must be able to make an unhurried, on-the-ground inspection of each tie in track, bearing in mind the standard of maintenance desired.

The inspection and marking should be done in advance of the work season, to realize full benefits in the ordering, shipment and distribution for renewals.

In actual practice, this work is done to good advantage by system tie inspectors, track supervisors, section foremen, or track inspectors. The renewal selection should not be left to the first laborer in the renewal gang, who marks the tie by pulling the spikes.

Collister: *Mr. Hubbard, if ties are marked by someone other than the foreman renewing ties, should some judgment be left to that foreman as to taking out additional ties, or leaving in some already marked?*

Hubbard: Yes, some judgment should be left to the foreman, especially when ties are being renewed with a raise of track. Often on a heavy-tonnage line on curves, ties are spike killed and detected when track is raised in that the ties fail to come up with the rails. Then again, there are some ties that have been marked to be removed that may show up to be a fair tie with additional life when track is raised.

The marking of ties to be removed from track at a certain time is important, and no two people will agree 100 per cent. To date, we have no device for determining the need for removal except by visual inspection. If crossties are unloaded economically and spotted for renewal at the



M. J. Hubbard, R. B. Radkey, W. E. Fuhr

a certain time is important, and no two people will agree 100 per cent."—M. J. Hubbard

"Tie pads are justified through the longer service life brought about through a decrease or elimination of tie-plate cutting."—R. B. Radkey

"... According to the report of our committee ... replies received from five leading railroads show that 9.4 per cent of the 2500 oak ties inspected in 1956 were removed because of tie-plate cutting."—W. E. Fuhr

tie spot, any variation from the actual spot either way causes added expense.

The main thing is the correct tie spot, which is difficult to get, and, for economical reasons, I think a good foreman should have the privilege of changing the spot.

Use of Under-Sized Ties

Collister: *Mr. Gingerich, are small, undersized—either hewn or sawn—ties acceptable for light-traffic branch lines or yard body tracks?*

Gingerich: In my opinion, no. I think ties specified for those types of tracks today are about as small as you can properly spike without fear of breakage or serious splitting. Also, the bearing area provided by the ties now specified is about the minimum we can economically use.

Collister: *Mr. Hubbard, how many years of service may be expected from mixed hardwoods and so-called less desirable species, when properly handled and installed under the most favorable conditions?*

Hubbard: If properly handled, treated and installed under the most favorable conditions, the mixed hardwoods and so-called less desirable species of ties will give approximately the same service life as the general run of what is considered the better grade of ties.

These species are considered less desirable on most railroads because of the special handling, treatment and installation required. If ties are air seasoned before treatment, the seasoning period varies with the species, and for proper treatment the species should be separated. If properly tie plated to prevent plate cutting, these ties can be installed in approximately the same locations with respect to curves, tonnage, etc., as the so-called better grade ties.

Collister: *Mr. Drew, should all ties be pre-bored or only the ties used in heavy-traffic territory?*

Drew: In my opinion, all ties should be pre-bored. The

advantages of pre-boring have very little to do with the amount of traffic. One of the reasons for pre-boring is that the spikes can be driven without splitting the tie, and also, you get a little additional penetration of the treating solution in the area where the spike will eventually be driven.

Therefore, the amount of traffic, or whether it is a line with heavy traffic, an important line, or a branch track, is not the determining feature. In my opinion, more advantages are gained from pre-boring ties on light traffic lines, where you get more service life, than on those with heavy traffic, where, oftentimes, your tie is removed for mechanical wear rather than decay, or causes where no benefit would be derived from pre-boring.

Collister: *Mr. Radkey, how is the use of tie pads justified?*

Radkey: Tie pads are justified through the longer service life brought about through a decrease or elimination of tie-plate cutting. Where plate-cutting is a prime consideration, tie pads can be justified. Where plate-cutting is a minor consideration, the use of tie pads is questionable.

Collister: *Mr. Fuhr, will the presence of mixed, different-sized ties in main track cause appreciable difficulty in track maintenance?*

Fuhr: Some roads are in the process of changing over from 8-ft to 8-ft-6-in ties, or, in some cases, 9-ft ties. During the changeover period—I'd say, 20 to 30 years, or longer—some minor variations in surface will occur as a direct result of the increased bearing capacity of the longer tie over the shorter one. However, this should not present any more of a problem than was present before the changeover started.

Why Low Renewals on UP

T. A. Blair (Santa Fe): I'd like to ask Mr. Drew a question, if I may. In looking over, oh, for 15 years, the average tie insertions per mile as reported by the Committee on Ties, you have had a most enviable record on the Union Pacific, with a low figure. I'd like to know whether you attribute any portion of that low figure to the fact that you use district gangs for insertion of ties?

In other words, the average road has section gangs insert or make the spot renewals of ties, where you have had district gangs doing it. Don't you think that a part of the good figure you have has resulted from the use of those district gangs?

Drew: That is probably true, Mr. Blair. However, you must bear in mind the fact that we have only been using district gangs in the last few years.

That seems to bear out your contention that possibly that is one of the factors. However, there are other factors which I consider as important. For instance, we have maintained a high standard in our ballast, and in my opinion that has contributed as much to our low annual renewal rate as any other one factor.

I might also say we've gone to heavier rail, larger tie plates, and, in general, a higher standard of maintenance, with the net results as shown in the figures. All of those factors have some bearing on our tie renewals.

Blair: I still want to stay with it just a minute longer, Mr. Drew.

Your neighbors have done the same thing; every one of

TIES—Their use in track

us has put in heavier rail, and we have improved our ballast. Some of us have increased the length of our ties, and still, I think it's about 12 years that this record of yours has been going on, compared with your immediate neighbors—one of which happens to be our railroad.

Drew: For the benefit of those who are not familiar with the geographical location, there are no two railroads that I can think of in the United States that are more similar than the Santa Fe and the Union Pacific. They operate through almost identical territories for considerable portions of their track. They also carry very close to the same amount of tonnage. Their operating conditions are quite similar. We don't use a better tie than you do. In fact, I question whether the tie we use is as good, because our ties are all softwoods, and you use some hardwoods. So that must be the answer to it, that the type of gang which we use for renewal has been largely responsible for our low average tie removal.

H. R. Duncan (Burlington): Apropos of the remarks by Mr. Blair, in comparing tie renewals on the Union Pacific and the Santa Fe, this committee made quite a study of tie-renewal cycles some years ago. At the time, it had the help of the Forest Products Laboratory. I don't believe we can be too sure in saying what life we are getting from ties, simply by looking at our last year's renewals, or those for the last five years or the last ten years.

For example, in this study, if you make an improvement in your standards that affect tie life—it may be species of wood or size of tie plate—probably the greatest factor is the change in treatment.

The Union Pacific's tie renewals are very low, but the UP made quite an improvement in its standards, as I recollect, about 1927 or 1928.

Drew: That's correct, Harry. We changed from zinc chloride to creosote petroleum, exclusively, beginning in 1927. However, the actual changeover took a matter of two or three years.

Duncan: Then, of course, they had the problem of zinc chloride treated ties. I don't know what the average life was—probably 16 to 18 years.

Drew: The average life of zinc chloride treated ties that we were getting, was right close to 18 years.

Duncan: So then, after they improve their standards, it takes 18 years to remove all of the old ties and to get benefit from the higher standard ties in track. Therefore, they should now be at a very low point in their renewal cycle.

On the other hand, studying some of the renewals on the Santa Fe, they have bored and added their ties, and had a high grade of treatment for a great many years. Consequently, the curve of renewals is pretty well straightened out on the Santa Fe, but I don't believe it is on the Union Pacific.

Drew: You're absolutely correct, Harry.

Duncan: I would figure that in the next 25 or 30 years, the figures will be somewhat reversed, and the Union Pacific's renewals will probably be higher, and there will be less fluctuation from one year to another on the Santa Fe.

Blair: I'd like to make one observation, and that is that the Santa Fe has gone to the same system of tie renewal that the Union Pacific uses now, and we will soon be in our cycle, so I think we'll have a pretty good comparison. But I still believe that where you uniformly pull out your ties every year you're going to get some additional life, over leaving it to the roadmaster, the superintendent, or even a poor section foreman, when he has so much rough track that he can't put in the ties that he is given.

Hubbard: I might say that the application of the report on our line might be a little bit contrary to our present practices. We're going to an 18-in tie plate on heavy-tonnage lines 2-deg curves and over. If we followed that report, we couldn't justify the 18-in plates but we think that maybe we can, after a period of time.

Effect of Geography

L. W. Kistler (Frisco): In analyzing the tie statistics from year to year, a point which has impressed me as much as any other (and which is seldom discussed) is the matter of geography.

Assuming that the major railroads of the country have approximately the same degree of maintenance, you will observe from those statistics that the railroads through the South, where they have a longer summer period, more rainfall, and average higher humidities, have considerably lower average tie life than the railroads through the North.

For example, as was pointed out this year, the average tie-year life, as indicated by the results in the New England region, was 56 years, I believe, or 54. Whereas, for the Southwestern region, it was 26.

I was wondering if any of the panel had given consideration—particularly those who serve, we'll say, the North and the South—to the distribution of species, or variations of treatments, whereby they might more nearly equalize the service life in the southern and northern areas?

Radkey: Yes, we have, to some extent, Mr. Kistler. On the Illinois Central, oak ties are used in the North, and gum ties are used in the South. We fear that the oak ties are more prone to splitting in the alternate wetting and drying they would receive in the South. Usage depends more on the ties available to us rather than on any other direct, clear-cut distinction. If we got into differences in the treatment, the problem of distribution would be extraordinary.

Collister: Answering from our own standpoint, we are putting our gum ties out on the Coast Lines, where we feel they will give us better results than the oaks, because they will not be so prone to splitting. We are putting a little more preservative into the gum ties, because they will take it where the oaks will not. Because of that factor, the excessive heat that they will be conditioned in will tend to give them a better coating as a result of the leaching or bleeding of the preservative under the sun.

Speaking for Themselves

"I would like to make one statement which I should have presented in prefacing this panel discussion. These statements are the ideas of the panel, and not necessarily those of the association or any individual railroad."—L. C. Collister

Colloidal mixer aims at

Getting the most out of cement

Here's something new in concrete and grout. It's a method of mixing cement, sand and water that's aimed at complete wetting and hydration of the cement and other ingredients. This is accomplished by a special mixer: the Colcrete Colloidal concrete mixer.

The output of the mixer is called Colgrout. When Colgrout is injected into pre-placed coarse aggregate the end result is called Colcrete. The process has been used for some time on railroads in both England and Germany, with reportedly good results.

This is the basic idea

The Colloidal concrete mixer is based on the principle that water must reach the entire surface of each cement particle before complete hydration can take place. But investigations are said to have shown that this condition is not always attained with conventionally mixed concrete.

Everyone who has spilled water in cement has observed that the drops of water, although covered on their surfaces with cement powder, stand for awhile before soaking in. This is attributed to the minute air bubbles which adhere to each cement particle and are held there by surface tension. These bubbles tend to insulate the particle from the water. Investigators have reported that many particles never become wetted, even in concrete hardened after 28 days' curing. When this happens, the cementing value of the particles which have not hydrated is wasted, with the result that these particles serve only as filler material.

This is where the Colcrete Colloidal concrete mixer comes into the picture. This mixer makes use of a disintegrator of the colloidal-mill type whereby the material is acted upon between two surfaces, one of which moves at very high speed. In this case a voluted rotor, moving at a speed of 2,000 rpm, and centrifugal action, are employed to cause sufficient agitation to the water and cement when passed through a narrow gap to tear the minute air bubbles loose from the cement particles, dispersing the particles and wetting them individually. The result, after 15 sec of such mixing, is said to be the complete hydration of the cement par-

ticles, forming a colloidal cement slurry without the introduction of admixtures.

How to make Colgrout

Colgrout is the name used for a grout formed by adding sand to the colloidal cement slurry and mixing it for another 10 sec in the same high-speed mechanical mixer. According to the manufacturer, the machine will take grout mixes as lean as 1 part of cement to 4 parts of sand, and produce a material in which the particles are so intimately mixed that the sand, for all practical purposes, does not settle out. The water-cement slurry is reported to behave as a liquid with a density of 1.4 which, according to Stokes' Law, will enable sand of normal density to be held in suspension, provided that the particles do not exceed 3/16 in. A well-graded, sharp, clean sand, 3/16 in down, and a minimum water content in the grout is recommended.

The water content of Colgrout is that required to produce a fluidity suitable for grouting purposes. Water-measuring tanks, appropriate for the mixing machine being used, are provided for obtaining an accurate means of water gauging. It is stated that the grout mixes have an angle of repose of about 1 in 10 for a 1-to-1½ mix, and 1 in 12 for a 1-to-2 mix, although Colgrout, with an angle of repose of about 1 in 6, is still pumpable by the Colcrete mixer.

Provided that the water content is kept to a minimum, the strongest Colgrout is reported to be a mix of 1 of cement to 1½ of sharp sand by weight. The higher the cement content, however, the more Colgrout will

Turn the page to see how this method was used on a railroad job

eventually contract. But the manufacturer of the mixing machine points out that, when Colgrout is introduced in pre-placed aggregate, this contraction is so controlled as to be unimportant. Colgrout is cured for at least a week in the same manner as conventional concrete.

After mixing, according to the manufacturer, the resultant Colgrout is stable, fluent, water-repellant, strongly adhesive and, when it has hardened, strong and impermeable. When applied to absorbent materials, such as porous brick, clay tile or burlap, the water-cement ratio is appreciably reduced after placement long before the initial set has taken place. This is said to have the effect of further increasing Colgrout's strength, density and impermeability.

The rotor of the mixing machine is used as a volute pump for discharging the Colgrout from the machine at a pressure of from 20 to 30 psi. This amount of pressure is said to be sufficient to deliver the grout through a hose over a radius of 150 ft. For distances over 150 ft, or for use through injection pipes for roadway-stabilization work, a grouting machine of the pressure type, having a discharge of 100 psi, is recommended.

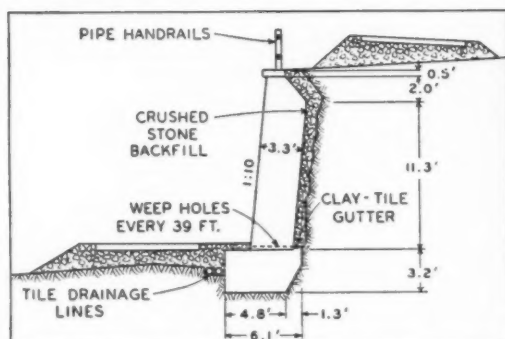
Can be sprayed on too

Colgrout also is used with pressure-spray application, similar to the Shotcrete method used in this coun-

Here's how a railroad retaining wall in Germany was replaced



OLD WALL was badly deteriorated so that it had crumbled in places.



CROSS SECTION of wall as reconstructed. It is about 600 ft long and ranges from 3 to 20 ft in height.



FORMS for the new wall were constructed along both faces to retain the broken-stone aggregate. It was built in 20-ft increments.

On the German Federal Railways, a retaining wall was used to retain the embankment for a line that was paralleled by another line at a lower level. The tracks are on about 3-deg 30-min curve and the wall, varying from 3 to 20 ft in height, was about 600 ft long.

The original wall was of quarried rock set in mortar and backed up with loose rock and earth fill. Time and seepage had eroded the mortar from the joints and the facing stone had badly deteriorated and crumbled. It was decided to replace the wall with a new one using the Colcrete process. The general dimensions of the new wall are shown on the accompanying cross section.

The old retaining wall was removed and replaced in sections about 20 ft long. Forms were built for both the front and back faces. No reinforcing was used.

Grout-injection pipes, spaced about 4 ft apart, were inserted and the forms filled with broken stone varying in size from 3 to 7 in. Colgrout was then pumped through the pipes one at a time so as to keep the grout in the forms approximately level.

The injection pipes were in 5-ft lengths, screwed together, and lengths were removed as necessary as the pipes were retracted while filling the forms.

The grouting equipment was mounted on a flat car to permit the work to be done by a mobile work-train outfit working from the higher track. A wood frame was constructed in the middle of the flat car for supporting a sand hopper, a screening plant, a weighing device and the discharge end of a long belt conveyor which reached back to a car of sand. Two Colcrete two-drum mixers, with water-mixing and stor-

try, where its adhesive nature is reported to enable it to adhere to vertical surfaces. However, instead of passing the dry materials by air pressure through the hose to the cement gun and introducing the water at the nozzle, as is done with Shotcrete, the Colgrout is made in the Colcrete mixer. It is then pumped at 100 psi by a grouting machine through the hose to a special cement gun where compressed air, escaping through a perforated ring surrounding the grout orifice, contains and accelerates the grout and forces it to strike the surface at high speed. The same air compressor used for pressurizing the grouting machine is used to supply the air at the nozzle.

Used in such a manner, Colgrout has been applied as linings in tunnels, water reservoirs and sewers and for encasing structural-steel and wood structures with a fire-protective coating. In one case on the British railways, the gun nozzle was so adjusted that Colgrout could be used for point-

ing up the joints of a brick-lined railway tunnel.

The Colcrete process of making concrete is divided into two parts: (1) The laying of coarse aggregates at the site and in the forms by which the final concrete is shaped, and (2) the introduction of Colgrout. The grouting of preplaced aggregate is not new to this country and has been used for many years. But Colcrete is made only when Colgrout is used for the water-cement-sand slurry.

Proponents of the process claim that Colcrete has several advantages over ordinary concrete. It is pointed out, for example, that large savings are made when the coarse aggregates, which represent about 40 per cent of the concrete constituents, are not handled through a mixing machine. Using Colgrout, it is claimed that 99 per cent of the surfaces of the ingredients are completely wetted in the mixer, leaving only 1 per cent of the surfaces, as represented by the coarse aggregates, to be wetted in the forms.

Also, cement and sand are saved because a cubic yard of the coarser aggregates is already in place for a cubic yard of work. This saving in sand and cement is reported to be about 20 per cent but could be as much as 40 per cent when two sizes of coarse aggregates are used.

Colcrete is said to be particularly advantageous for underwater work. Since Colgrout is water-repellent and comparatively immiscible with water, losses of cement are said to be negligible and the resultant concrete will be more dense, homogeneous and impermeable than ordinary concrete.

The only limit placed on the size of the coarser aggregate is that it must be over 1½ in and be able to go into the forms. In Europe large uncrushed stones are frequently used, some being boulders 3 ft in size.

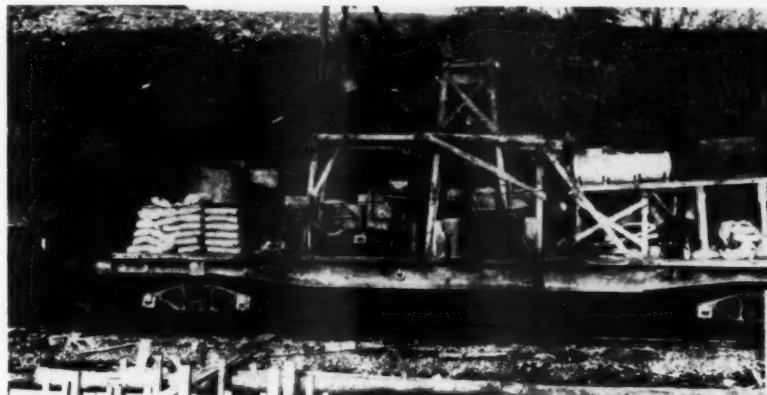
Both Colgrout and Colcrete have been used for various purposes by the German Federal Railways, the British Railways and the Dutch State Railways.

by pumping Colgrout into forms containing pre-placed stone

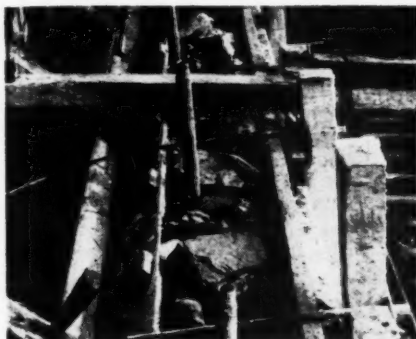
age tanks, and a Colmono grout pump were also mounted on the flat car.

The sand was screened to remove particles having a grain size greater than 3/16 in and also to remove possible impurities. The grout was mixed in the weight proportion of 1 of cement to 2.5 parts of sand, and the water-cement ratio was 0.52. Tests made later on samples of the resultant Colcrete showed a compressive strength of over 4,265 psi. No back waterproofing was used.

A clay-tile gutter was installed behind the base of the new wall on the footing, which discharges through weep holes inserted through the wall every 39 ft. After stripping the forms, the wall was backfilled with crushed stone. Small tile drains were installed in front of the footing to carry away drainage. A pipe handrail on the wall coping completed the structure.



MOBILE OUTFIT included two Colcrete two-drum mixers and a Colmono grout machine mounted on flat car. Sand was screened before using.



INJECTION PIPES were installed at 4-ft intervals before filling the forms with stone.



FINISHED WALL was backfilled with crushed stone. Clay-tile gutter behind it discharges through weep holes at 39-ft intervals.

Some recent projects on the German railways include: The replacement of a crumbling masonry retaining wall between adjacent tracks near Nuttlar, Sauerland; the renewal of a crane runway and a mixing basin for fine and boiler coal at its central power plant near Gladbach; the construction of a wheel-storage platform and a jacking platform at a repair shop in Frankfurt-Nied; the construction of a locomotive work pit at a repair shop at Limburg-Lahn; the repair of cracks in a leaking cinder pit at Gladbach; the reinforcement of a war-damaged quay in Cologne-Mulheim; and the lining of a diversion tunnel through water-bearing rock at Trier.

It is also reported that the British railways used Colcrete equipment for speeding up the planting of catenary-supporting masts during an electrification project; for the stabilization of roadbed and embankments; for the construction of new bridge piers and abutments, as well as the internal

consolidation of existing piers and abutments; the replacement of existing retaining walls; and the lining of railway tunnels.

Several dams in other countries are reported to be constructed of mass concrete made with Colcrete equipment. In such instances, the consolidation was made by applying Colgrout in 4-ft lifts.

Uses in this country

The U.S. Corps of Engineers used Colcrete mixers in making neat cement for foundation-consolidation grouting of Folsom Dam and its related structures near Sacramento, Calif. It is reported that the thorough wetting of the cement particles produced better penetration and enabled more grout to be placed in finer rock seams than would have been possible with the use of conventional mixers. The short mixing time required by the Colcrete mixer materially speeded up the work, it is said.

On the Folsom Dam project, the Corps of Engineers purchased two Colcrete outfits and modified them to make each of the smaller cement-water mixing tanks the same size as the sand-slurry mixing tanks. Controls were changed to permit the plants to be operated separately or together. The two machines then were capable of mixing up to 300 sacks per hour of neat cement.

Another project carried out in the United States with Colcrete equipment involved the rehabilitation of mortar joints in some granite-faced piers located in New York City. The joints, as well as the concrete backing of this masonry, had eroded severely between the mean low-water level and a line 6 ft above. The joints were cleaned with sandblasting and were grouted under pressure to restore the granite facing to good condition.

Rights to the Colcrete equipment and methods are held in this country by the Chemocem Company, 72 Wall St., New York 5.



This suburban station has the 'lo

● Pictured on these pages is the Great Northern's new suburban station facility, recently put into service at Edmonds, Wash., 17 miles north of downtown Seattle. Designed in keeping with modern architecture of the Puget Sound region, the station features building materials most common to the West.

The exterior of the building is finished in rough cedar siding, with the interior paneled in knotty western cedar. Portions of the exterior walls are faced with Roman brick, and all windows are framed in aluminum.

The passenger platform is of concrete, with the trackside platform beyond the station proper and the parking area to be paved with asphaltic concrete. The parking area, designed to accommodate 175 cars, is enclosed with steel mesh fencing and the entire station area—which is more than two city blocks in length—is flood-lighted.

Construction of the \$160,000 facility included single-tracking the road's main line for several hundred feet north and south of the station as a safety measure for passengers

boarding or leaving trains, bound in either direction.

In conjunction with the opening of the new station, the Great Northern is also making available to its patrons a new service involving conditional stops for all GN transcontinental and international (Seattle to Vancouver) trains.

The new service, says Thomas Balmer, Great Northern vice-president at Seattle, "is geared to the changing needs of travelers." Officials point out that the new station—replacing one built in 1891—will not serve as

Waiting room as seen from . . .



THE OUTSIDE: Attractive interior is displayed with big windows and effective lighting.



THE INSIDE: Knotty western cedar panelling is employed throughout the interior.



NEW STATION, a convenience for suburbanite through-train patrons, has baggage, express and freight facilities, too.

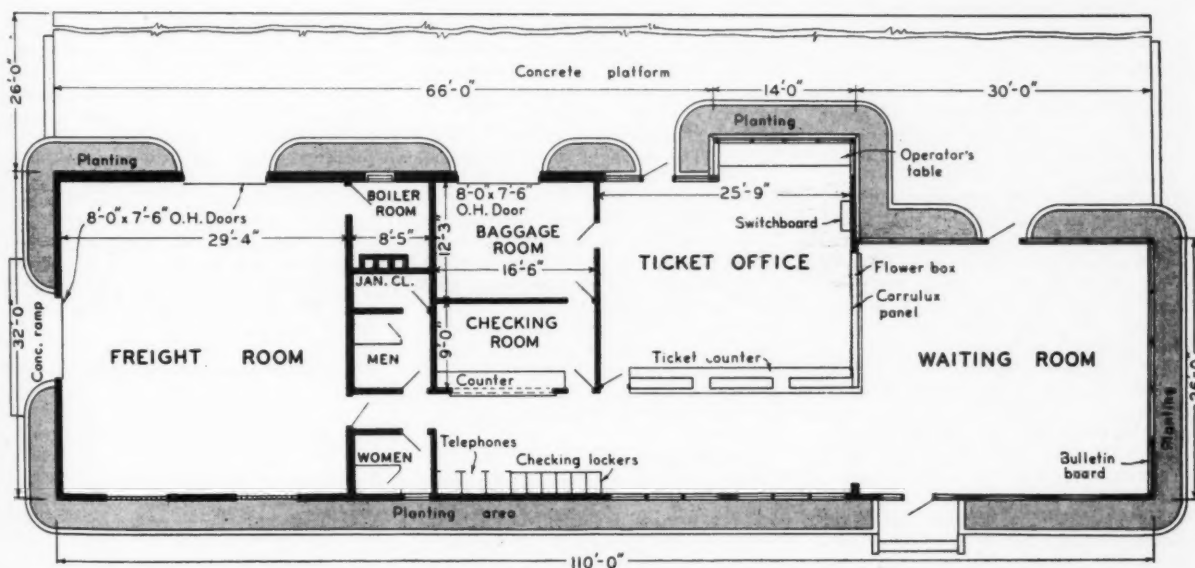


ROUGH CEDAR siding (above) and Roman brick are used on the exterior of the station. BELOW: Work area is separated from rest of station by ticket counter and translucent plastic panel in background. Operator's table is shown at the left.

ne 'local look'

a commuter facility. Rather, it will accommodate travelers to and from non-local points on the GN and connecting lines—eliminating the need for the suburban dweller to drive to Seattle's downtown King Street station.

With the population center of Seattle lying considerably north of the downtown area, it is expected that the new suburban facility, with its attendant parking accommodations, will serve not only as a welcome convenience to present patrons, but will attract new business as well.



EXTENSIVE fenestration is in line with the "local" theme of the architecture.

Teaching welders how to maintain

How can you get the most life out of your manganese-steel track-work castings? What type of maintenance is necessary to attain this end?

These are questions of interest to every track man. But it is of particular importance that the welders who do the work know the answers:

To provide them the American Manganese Steel Division of American Brake Shoe Company, as a service to the railroad industry, operates a small school for training railroad welders in the theory and practice of welding and otherwise maintaining frogs and other items made of manganese steel.

On these pages you can "see for yourself" what is taught at the school.

This is the school...

The welding and care of manganese steel castings are an art—but one which can be mastered by any skilled welder when he is familiar with the properties of this alloy steel and the technique of working on it. Amsco's school, conducted at its plant at Chicago Heights, Ill., is that company's way of contributing its knowledge and experience with this metal alloy to the railroad industry.

The school is actually an outgrowth of years of previous training of individual welders in the field. It all started back in 1917 when a western railroad appealed to Amsco for help in solving a manganese-steel frog problem. Although the frog was not of Brake Shoe manufacture, the company decided to send a man out to see what could be done to take care of this situation and to keep the railroad viewing manganese steel with favor.

The man chosen for this task was Bill George. He had worked in every department of Amsco's shops and

had acquired the reputation of being an idea man and a trouble shooter. He went out in the field and, finding the difficulty, suggested corrective measures which satisfied the railroad.

Other railroads, hearing of this assistance, also put in calls for Bill's services. Believing that this service not only helped welders in the field to a better understanding of manganese steel but also proved that this alloy could be welded successfully, Amsco continued to make Bill George available to the railroads. Requests became so numerous that it was decided in 1949 to establish a school where several welders at a time could be given a concentrated course in the technique of maintaining manganese-steel trackwork. Amsco set aside one of its buildings for the welding school and has equipped it for the training course.

One section of the building serves as the instruction room. It is equipped with tables and chairs, blackboard and lockers. The other

This is what they teach...

... About manganese steel

Try to pick up a small piece of manganese steel with a magnet and you'll find that it won't work. This is because manganese steel is non-magnetic. Although almost all steels contain the metallic element manganese, which is added to the molten metal for purifying it and for increasing its ductility and workability, the amount is so small that the steel retains its magnetic characteristic. But, when manganese is added in the proportions of from 12 to 14 per cent, which is the percentage range used when producing commercial manganese steel, the resultant steel for all practical purposes is non-magnetic when heat treated.

The essential constituents of standard manganese-steel alloy are iron, manganese and carbon and, in most commercial foundries, these are melted in the basic electric-arc furnace. The carbon range is from 1.00 to 1.40 per cent and this element has a slight but distinct effect on the strength of the alloy, both decreasing together. In commercial production, there is a tendency to operate close to the mid-

point of the carbon range and at 12 to 13 per cent of the manganese range, as the lower limit without special alloy additions is associated with somewhat inferior tensile properties and the upper extremes offer no economic advantage.

After manganese steel is cast, it is quite brittle. The casting is then placed in a heat-treating furnace and heated to about 1,850 to 1,900 deg F. It remains in the oven one hour for each inch of thickness, after which it is promptly immersed in cold water and cooled quickly. This treatment changes it into a soft, ductile metal and "the toughest steel known" today. At this point in its manufacture, the metal has nominal mechanical properties as follows: tensile strength 124,000 psi, yield strength 53,000 psi, an elongation of 45 per cent, and a hardness of from 185 to 200 BHN.

Manganese steel has another characteristic—the ability to work harden under impact. This makes it particularly suitable for such uses as in turnout and crossing frogs, switches, guard rails, car replacers, rail clamps, car stops, dozer blades and buckets.

The longer manganese steel is used under rail traffic, the harder it becomes. On the other hand, this work-hardening quality also makes this steel extremely difficult to cut with a chisel, because the metal work-hardens under the impact of the tool. The metal will harden under impact from about 250 to 500 BHN. The light blow will cause shallow deformation with superficial hardening, though it may be intense. Heavy impact produces deeper hardening with usually lower hardness values. Cracks are slow to propagate in manganese steel, which increases its safety factor.

It is important that manganese steel castings are not heated above 500 deg F for a prolonged period of time because the metal can then develop undesirable brittle properties.

... About manganese electrodes

The discussion at the welding school on the types of electrodes and their properties was confined to those which Amsco makes specifically for maintaining manganese castings. The subject was divided into two phases: (1) Bare versus coated manganese electrodes and (2) manganese-steel weld deposit structures.

It was first pointed out that the filler

manganese frogs

section, much longer, serves as the school shop and is equipped with six welding machines, gas welding and cutting equipment, work benches, exhaust fans, hoists, arc-length monitor meters, arc shields, pneumatic grinders, peening tools and other equipment.

Has four classes each year

Four classes are arranged each year, two in February and two in November, when the welders can best be spared from their duties on the railroads. The Railroad Products Division of American Brake Shoe Company sends out invitations to railroad chief engineers and each one selects the welders who shall be permitted to attend the school. Sometimes welders write to Bill George direct for an invitation and then make arrangements with their superiors for the time away from their railroads. Classes number between 10 and 30 men.

Each class spends a full week at the school. The men are first addressed by one of Amsco's metallurg-



gists to give them a better understanding of manganese steel and its properties. They also are conducted on a tour through the plants of Amsco and Ramapo Ajax (now Railroad Products Division) so they can see how manganese-steel frogs, crossings, guard rails and welding electrodes are made.

Bill George and his assistant, Charlie Sexton, then pack into the remaining time the important things they



ABOVE—Bill George (left, background) explains how to maintain manganese-steel castings to 15 welders seated at tables in the classroom.

LEFT—Charlie Sexton describes the operation of an automatic welder in the shop.

How to weld a manganese frog

have learned about track maintenance. These include information on the types of electrodes (see below) and properties, preparation of castings for welding, welding equipment and techniques, and finish grinding to gage.

The welders also learn by doing and are furnished worn castings on which to practice. The worn castings are scrap items obtained from the railroads.

metal to be added in the molten form is generally used in wire or rod shapes. The composition of the filler metal should be an austenitic manganese steel material related to that of the base metal where it is desired to avoid any great discontinuity in physical or chemical characteristics.

Manganese steel electrodes are available in both bare and coated electrodes. The coated electrodes can be used for d-c reverse polarity and a-c welding. The arc stability of the coated electrode is much greater than that of the bare rods which is a decided advantage particularly when welding outside on a windy day. Both types are used.

When welding is to be done with d-c current, reverse polarity is recommended, to minimize penetration and heating of the coating. Minimum amperage is used to obtain proper penetration.

When used to build up manganese-steel castings, the deposit has a work-hardening capability comparable to the base metal. The Brinell hardness of deposited manganese-steel electrodes gives no indication of the ability to resist impact. It is relatively soft and cannot be hardened by any economic process of heat treatment. However, cold working, as encountered in track service, may harden the deposits to as high as 550 BHN.

... About welding technique

When working on manganese steel the metal should be deposited by using a weaving technique with the electrode held at a 45-deg angle to the direction of welding. The width of the bead should be twice the diameter of the electrode and the arc length approximately equal to the electrode diameter.

Bill George explains that the crescent weave permits the deposited metal to remain molten for a longer time than with the conventional weave used when welding mild steel. Gas which might otherwise be entrapped can readily escape from the molten pool and the resultant heavy bead serves to reduce the hazard of cracks which sometimes occur because of using the improper welding technique.

The arc is struck by touching the work with the electrode and quickly withdrawing it a distance not exceeding that required for maintaining the arc. The arc is maintained by a uniform movement of the electrode toward the work to progressively compensate for that portion which has been melted and deposited in the weld. At the same time, the electrode also is progressively advanced in the direction of the welding.

Welding is stopped by dropping the

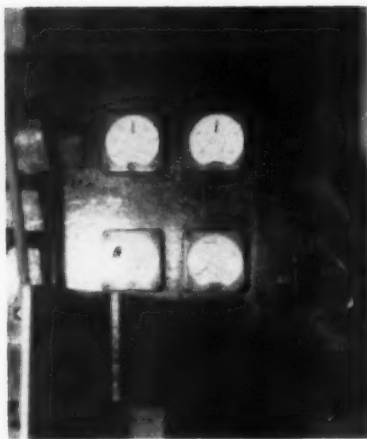
electrode back into the weld deposit and breaking the arc. Care should be taken to fill the crater to the full weld size before breaking the arc to avoid crater cracks. The arc is restructured ahead of the crater and then drawn back.

Weld beads are subject to tension as they cool and, to minimize cracking, it is desirable to peen them while hot. Peening changes tension into compression stresses and thus minimizes distortion of the base casting. Peening should be done immediately after the welding is stopped, with the beads not more than 3 in long. The point where the arc was broken should be peened first and then the remainder of the bead in the direction of the welding.

The beads should be distributed so as to avoid concentrated and prolonged heat in the parent metal at any given area. This means skip-stop beads. Welding should not be continued on a bead unless the base metal is below 750 deg F. This temperature can be determined by the use of Tempilsticks, which are crayon-like and will melt at the temperature indicated on the stick. A 500-deg Tempilstick is recommended, which gives a 250-deg factor of safety. A mark is made from $\frac{3}{8}$ in to $\frac{1}{2}$ in from the weld and, if it melts, it indicates that the work is too hot to continue work in that area.



1 Good practice requires the gripping of an 18-in rod at its center and inclining it at about a 45-deg angle.



2 Arc-length monitor enables welder to determine by signal lights when he is maintaining proper arc length.



3 Flashlight and magnifying glass should be employed while grinding for revealing defective areas in casting.

Pointers on procedure (As made by Bill George and Charlie Sexton)

- Manganese-steel frogs will serve longer if properly maintained by grinding.
- More grinding of flowed metal in frog flangeways should be done.
- Be sure to inspect the casting for cracks while grinding and continue to grind until the cracks or porosity are removed.
- Before depositing any metal, be sure that all edges of the casting are rounded off.
- Carry and use a 500-deg F Tempilstick. Apply marks from $\frac{3}{8}$ to $\frac{1}{2}$ in from where you're going to weld.
- The electrode must be moved uniformly to obtain a uniform bead.



6 Bead should be applied by a weaving motion to produce uniform ripples. Each bead should be about 3 in long.



7 Peening should be started immediately after formation of bead to change tensile stresses to compression.

This is what they teach . . .

...About welding procedure

If you are like many other railroad men, you don't pay much attention to the kind of frog a track welder is working on when you see him sitting on a box of electrodes placed across the rail. You see the intensely bright blue light and the occasional spark which flies off into space and you sense that he is building up the worn parts of the frog. Actually, if pressed, you'll admit to a faint notion that one welding job is the same as another.

The truth is, however, that it is very important to the welder to know the kind of metal on which he is working as this determines the kind of welding rod, the melting medium and the procedure he should use.

In general, manganese-steel track castings are reclaimed by welding the cracks and defects and building up

the worn areas. The areas of the most wear on a frog casting are usually: The nose or point; the wings adjacent to the point; and the ends of the frog on the running surface at the rail joint. The areas of most wear on a crossing are the points, and the ends of the crossing on the running surface at the rail joints.

There usually are some areas on the surface which are not worn to any great extent. These areas, by employing a straight edge, may be used as a guide for determining how much metal should be applied. An excess of weld metal should be applied to the worn areas and the weld lapped over the edges approximately $\frac{3}{16}$ in higher than the finished dimensions to permit the removal of irregularities and to provide a smooth sur-

face following the finish grinding operation.

In the preparation of the casting before welding, care must be taken to remove all work-hardened metal, spalled edges, cracks and defects by grinding. Work-hardened metal is of a different structure and will embrittle more rapidly than the unchanged soft base metal.

A quick means of determining when the grinding has taken off the work-hardened surface is by the use of a home-made tool. This is a center punch which has been rounded off at its end to a small ball, then hardened. By tapping the punch on an unhardened area of the casting, such as the bottom of the flangeway, and again on the surface being ground, a comparison of the impressions will reveal when grinding has progressed far enough to remove the work-hardened metal. Grinding should be continued until the impressions are of the same diameter.



4 Home-made hardness tester is used for determining when all the work-hardened area has been ground away.



8 Crater of this bead should have been filled first before stopping deposit of metal and starting peening.

When grinding, says Bill George, the grinding wheel should be moved back and forth over the area and not stopped at one spot. Grinding heats metal rapidly and every effort should be made to keep the temperature of the manganese base casting below 500 deg F.

During the grinding operation, a close inspection of the ground area should be made with a magnifying glass to find cracks in the metal. All cracks, no matter how minute, should be given attention and the base metal ground away below the crack. Sometimes cracks are signs of a porous area deeper in the casting. The use of a cutting torch is not recommended for removing the metal below the cracks.

The sharp edges along the flange-way should be ground to a $\frac{3}{16}$ -in radius preparatory to welding. This avoids objectionable excessive penetration caused by heat concentration and the subsequent embrittlement of



5 Scrap frogs are purchased from railroads and are used in the shop for practicing procedure. Charlie Sexton demonstrates how the electrode is fed continuously to the work when using AMSCO's semi-automatic welding attachment.



9 In addition to this Leader automatic welding machine, the school shop contains five other welding machines, gas welding and cutting equipment, exhaust fans, arc shields, pneumatic grinders, peening tools and other equipment.

the weld deposit along these edges. In some cases, as when the impact has been severe, it may be necessary to grind to a depth of $\frac{1}{4}$ in below the surface to remove the work-hardened metal.

Special grinding wheels are not required. However, some types are more efficient than others, depending upon the speed, grit and bond. Resinoid bond wheels will allow higher speeds than vitreous bond wheels and are more efficient. After the welds have been completed, the casting should be finished ground. All surface irregularities should be removed by grindings to provide a smooth straight surface.

Sharp edges should be removed from the casting and the edges ground to the proper radius of approximately $\frac{7}{16}$ in.

Gauges are available for proper grinding of all frogs and crossings. The surface of the frog point should be ground $\frac{3}{16}$ in lower at the point

tip and taper to zero 8 in back from the point.

Bill George believes that more grinding should be done and he states more life is secured from castings when properly maintained by grinding. He points out that even a new-manganese-steel frog should have its flangeways ground to proper radius after it has been in service from three weeks to three months, depending upon the traffic. As this metal work hardens, it flows out into the flangeways and should be removed. He also recommends a second grinding two or three months later. He states that, if this is done, the frog will go for a long period before it needs further attention.

Another point of grinding is where the casting meets the running rails. These points should be rounded off and kept from flowing onto running rails. A rounded edge is structurally much stronger than a sharp edge, he says.

Ten Commandments of Safety For Supervisors

Your job in management places you in a unique position of trust. For not only does the company rely on you, as the direct representative of management, to apply its policies wisely and fairly; also entrusted to you is the obligation to safeguard the well-being of the workers in your charge. No responsibility transcends this in importance. In this respect your job is akin to the "stewardship" of Biblical days: As a supervisor, you are indeed your brother's keeper.

On-the-job accidents represent a serious threat to the physical well-being of your men. Their prevention calls for your constant vigilance. Therefore, if you would guide your men safely through their daily work, be yourself guided by these precepts:

1. You are a supervisor and thus, in a sense, have two families. *Care* for your people at work as you would care for your people at home. Be sure each of your men understands and accepts his personal responsibility for safety.
2. *Know* the rules of safety that apply to the work you supervise. Never let it be said that one of your men was injured because you were not aware of the precautions required on his job.
3. *Anticipate* the risks that may arise from changes in equipment or methods. Make use of the expert safety advice that is available to help you guard against such new hazards.
4. Encourage your men to *discuss* with you the hazards of their work. No job should proceed where a question of safety remains unanswered. When you are receptive to the ideas of your workers, you tap a source of first-hand knowledge that will help you prevent needless loss and suffering.
5. *Instruct* your men to work safely, as you would guide and counsel your family at home—with persistence and patience.
6. *Follow up* your instructions consistently. See to it that workers make use of the safeguards provided them. If necessary, enforce safety rules by disciplinary action. Do not fail the company, which has sanctioned these rules—or your workers, who need them.
7. *Set a good example.* Demonstrate safety in your own work habits and personal conduct. Do not appear as a hypocrite in the eyes of your men.
8. *Investigate and analyze* every accident—however slight—that befalls any of your men. Where minor injuries go unheeded, crippling accidents may later strike.
9. *Cooperate* fully with those in the organization who are actively concerned with employee safety. Their dedicated purpose is to keep your men fully able and on the job and to cut down the heavy personal toll of accidents.
10. *Remember:* Not only does accident prevention reduce human suffering and loss; from the practical viewpoint, it is no more than good business. Safety, therefore, is one of your prime obligations—to your company, your fellow managers, and your fellow man.

By leading your men into "thinking safety" as well as working safely day by day, you will win their loyal support and cooperation. More than that, you will gain in personal stature.

Good men do good work for a good leader.

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PALESTINE, TEX., is the site of this new station recently erected by the Missouri Pacific, replacing—on the same site—a building constructed in 1891. The new building is an example of the type of architecture which has been used in MP buildings for the past few years, and which will be used in future stations.

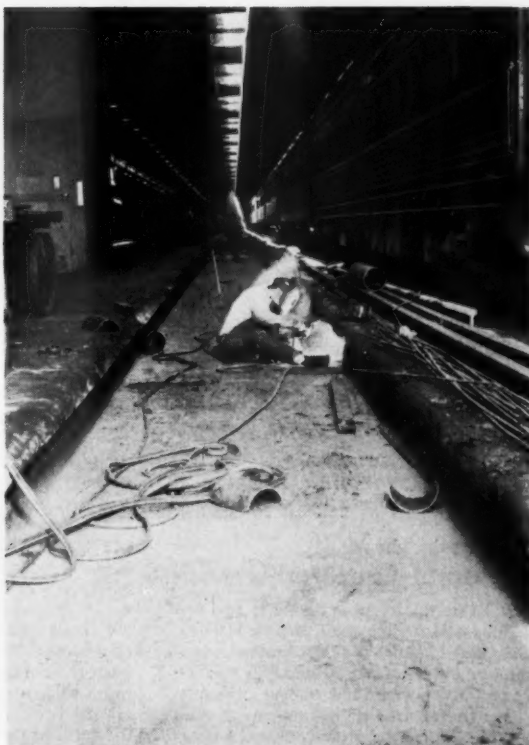
News Briefs in Pictures...



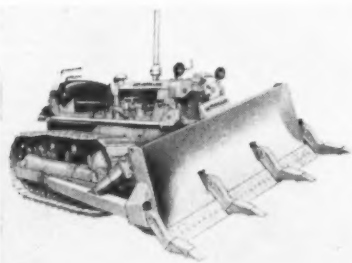
STEEL CRADLE is used by the Jersey Central in gondolas which are employed in the loading and unloading of continuous welded rail. The cradles, which eliminate the need for timber blocking, were designed by Storekeeper Edward Spehalski at right.



ERIE'S TRACKS through Passaic, N. J., are now fenced with 7,600 ft of Armco Flex-Beam guardrail, as shown here. Installation of the railing was a part of a \$500,000 improvement project which included replacement of the old passenger station, installation of automatically-controlled flashing light signals, short arm gates and warning bells.



WROUGHT-IRON drainage troughs are shown here being installed for tracks in the LaSalle Street station in Chicago. Trough sections were placed in position and joined by welding. Work was done as part of an extensive station modernization and improvement program.



Bulldozer blade has . . .

Ripper teeth

DESIGNATED the "Gyro Dozer," a new earthmoving tool combines the functions of ripping and moving material in one bulldozing operation, and is said to eliminate the need for a separate ripping operation. When working in hard-to-handle material, it is said to produce full blade-loads in less time and shorter distances. The ripping action is obtained by four penetrating teeth mounted on the cutting edge of the bulldozer blade. These extend forward 20 in. in front of the cutting edge and may be lipped both forward and backward, or tilted 20 deg to either side, by the tilting actions of the blade. As the teeth enter the hard-packed material, the earth is broken up before coming into contact with the dozer blade, thus increasing the penetrating action.

The Gyro Dozer teeth are equipped with replaceable digging points, which are said to be easily replaced. The teeth themselves are made of cast steel and the rear of each tooth shank is tapered on all surfaces and fits into a tapered box which is welded through the moldboard. The shanks are held in place by a tapered key. *Caterpillar Tractor Company, Dept. RTS, Peoria, Ill.*



Impact principle in . . .

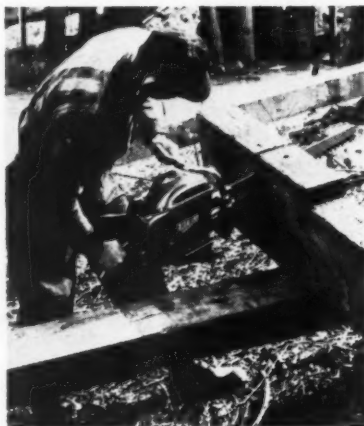
Hand-operated wrench

BOLTS up to 1 3/4 in. in diameter can now be loosened or tightened to practical tensions by a single workman using a new hand-operated tool, designated the Swench which incorporates the impact principle. The manufacturer states that any desired bolt tension can be produced by the operator by presetting a spring which controls the impact force and number of blows applied to the fastening.

The Swench is used like an ordinary ratchet wrench. It has two drive exten-

sions, one for tightening and one for loosening. Standard square-drive sockets are used to engage nuts or heads of fastenings. When the Swench handle is pulled, powerful spring-actuated rotary hammer blows are delivered automatically to the fastener through the socket at torque values up to 20 times that applied by the operator. One impact is delivered for every 30-deg movement of the handle.

The Swench is presently available in three models. Model 500 fits 1/2-in sockets, takes a range of bolts through 3/4 in, is 11 in long, weighs 4 1/2 lb and produces a stress in the bolt of 50,000 psi for 3/4-in bolts 1 3/4 in long, or 70,000 psi for 1/2-in bolts 1 1/4 in long. Model 750 fits standard 3/4-in sockets, takes a range of bolt sizes from 1/2-in through 1 1/4-in, is 16 in long, weighs 10 1/2 lb and produces a stress in the bolts of from 60,000 to 70,000 psi. Model 1000, designed for 1-in sockets and for bolt sizes up to 1 3/4 in, produces a stress in the bolts up to 70,000 psi. *Swenson Engineering, Dept. RTS, P.O. Box 43, Branford, Conn.*



Field tests lead to . . .

Improved power saw

AFTER a year of field testing in various parts of the United States and Canada, a new version of the Wright Power Saw has been made available under the trade name of Wright Rebel. One of the biggest changes in this gasoline-powered reciprocating saw is in the front assembly, which was redesigned to permit the unit to operate at top efficiency even under sandy soil conditions. The governor assembly has been redesigned to provide smoother and more efficient operation. The front housing has been completely sealed to prevent the entry of foreign matter into the engine. The governor end of the crankshaft is chrome plated for longer wear. A new air filter assembly protects the filter from the elements and is designed to keep out sand and sawdust.

A new magneto assembly has cooling fins cast into the flywheel to provide more cooling area and better cooling for the firing cylinder. The magneto also has larger diameter breaker points and is moisture resistant. The saw has an all-position carburetor to make it possible to saw at any angle. Other items incorporated in its new design include the addition of a leg to the air-shroud base for better stability and added clearance to make the governor pin more accessible for replacement. Also, the saw blade has been lengthened to 20 in, and the unit now weighs less than 25 lb. *Wright Saw Division of Thomas Industries, Inc., Dept. RTS, Louisville, Ky.*



Power feed for . . .

Derrick diggers

THREE new attachments now make it possible to use the weight and hydraulic power of the derricks to feed Holan diggers into the ground. The downward force, created entirely by the live-boom derricks, is said to make it easy to dig into hard ground without the use of a man to guide the diggers.

Used with the three types of live-boom derricks mounted on Holan line-construction-body trucks, the attachments are mounted on one of the three legs of the derricks to hold the power-feed mechanism which powers the diggers. The Series 4407 power feed linkage and the Series 4411 rigid-bracket-type power feed are designed for Holan's Series 3700 derrick, and the Series 4412 bracket-type power feed for the Holan Series 5700 derrick. The linkage is attached to the side legs, whereas the bracket types are located on the middle leg.

Although the derrick boom travels in an arc, the linkage is said to provide for a straight vertical force on the digger, resulting in straight holes. The linkage is mounted off center to permit digging close to obstructions. A torque arm is provided because of a built-in swivel.

The two bracket types make it possible to get under low lines easier because the digger is closer to the derrick. The 4411 has a torque arm for the built-in swivel. An optional torque arm can be provided for applications where the digger is detached from the 4412 bracket. *J. H. Holan Corporation, Dept. RTS, 4100 W. 150th St., Cleveland 11, Ohio.*

What's the answer?

To be answered in August . . .

Do you have an answer to any of the questions listed below? If so, send it in. Payment—based upon substance and length—will be made for each published answer. If you'd prefer that your name be withheld, we'll gladly comply.

DEADLINE: June 28

- ▶ 1. To what degree is it possible to do away with the use of wood tie plugs in rail-renewal work? What are the advantages and disadvantages of substitute materials and compounds? Explain.
- ▶ 2. What are the relative advantages and disadvantages of applying paint and other coatings to steel structures by spraying? By brush? Explain.
- ▶ 3. To what extent is it practicable for M/W forces to use trucks leased from commercial truck-leasing concerns? What are the advantages and disadvantages of leasing trucks as compared to purchase and ownership of such vehicles? Explain.
- ▶ 4. What are the relative advantages and disadvantages of the various window screening materials on the market today, such as plastic, aluminum, copper, etc.? How do they compare in first cost and maintenance cost? Explain.
- ▶ 5. What methods can be used most effectively to prevent the formation of slime and algae deposits in recirculating-type water-cooling systems? Explain.

Send answers to:

What's the Answer Editor
Railway Track & Structures
79 West Monroe Street
Chicago 3, Illinois

Do you have a question you'd like to have answered in these columns? If so, please send it in.

Unload ties which way?

When unloading ties from cars, is it preferable to unload them lengthwise or endwise? When unloading ties on an embankment, what precautions can be taken to prevent the ties from rolling or sliding down the slope? Explain.

Store near fills, cuts

By **EDWARD WISE, JR.**
Engineer, Maintenance of Way, Louisville
& Nashville, Louisville, Ky.

Our ties are loaded lengthwise in gondolas with enough ties loaded endwise in each car to keep the ties from shifting during transit.

Placing the ties about where they are to be used is our desired practice and we unload the top layers as they have been placed in cars. As we get down into the cars, the lower layers are unloaded endwise. We have found this to be the safest method for unloading ties from work trains.

Where ties are unloaded for use in narrow cuts, or where they might roll or slide down embankments, it is advisable to unload them as near such places as we can find sufficient storage space. We then truck such ties to the final location immediately before they are used, thereby preventing the handling of such ties up the embankment—an expensive as well as an unsafe practice.

Depends on roadbed

By **H. S. CHANDLER**
General Supervisor of Track, Chesapeake
& Ohio, Richmond, Va.

When unloading crossties on fills, a work train is involved and, in most cases, the train must move very slowly while the ties are being unloaded. Ties are loaded mostly in flat bottoms or box cars. Where the roadbed is wide the ties can be headed over. Where the roadbed is narrow, however, the ties should be put out on end with the back ends slightly in the direction that the train is moving. The movement of the train will then level them to the ground. This will apply on light fills.

Where the fills are high and the roadbed narrow, I suggest that ties be unloaded at the end of the fill and trucked to place later, for it is very costly to get ties up on high fills. Where the roadbed is narrow there is no way to unload ties with a work train that some of them won't roll over the bank.

Unloading by machine

By **R. H. GILKEY**
Division Engineer, Central of Georgia,
Savannah, Ga.

In unloading ties from special tie cars—where the ties are pushed out by a machine—they naturally are placed endwise. When placing a tie prior to its insertion along the track, it is placed endwise with the nearest head of the tie 10 ft from the center of the track. This method places the tie in position for insertion by the tie machine. The new tie is placed just ahead of the tie that is to come out, so that as the old tie is being removed the new is in position for insertion in track.

When ties are unloaded on an embankment the unloading must be done with care so as to prevent the tie sliding down the fill. There is usually enough grass and wires on the embankment to hold such a tie in place.

End-Wise preferable

By **R. D. SIMPSON**
Maintenance Engineer, Norfolk & Western, Roanoke, Va.

Treated crossties are loaded in low side gondolas and forwarded from the treating plant, located on our line, directly to the point of use where they are, in general, unloaded and

What's the answer? (cont'd)

distributed by hand. It is preferable that they be unloaded end-wise so as to be in position for insertion by mechanized gangs. Our roadbed is sufficiently wide in most territories to permit unloading in this manner but,

in locations where the fill is narrow, the ties may be unloaded lengthwise and later placed in position for insertion.

Insofar as the unloading operation is concerned, we find that ties can be handled in one position as easily as the other.

When ties are needed in a loca-

tion adjacent to an embankment where the roadbed is of such width that ties may roll down the embankment—even if unloaded lengthwise—we find it advisable to unload them in a pile at the end of the fill. These ties are later distributed and positioned from a push car using a Burro crane or Gandy machine.

Obtaining high-caliber b & b men

In view of the high wages presently being paid carpenters, electricians and other building craftsmen in home and industrial construction work, what means can be used to obtain high-caliber men for employment in railroad B & B gangs? Explain.

Provide incentive

By B. L. BEIER
Engineer, Maintenance of Structures, Delaware, Lackawanna & Western, Scranton, Pa.

Many of the high-caliber men in our bridge and building gangs are men who are interested in railroad work and who have been employed by the DL&W for many years. As a matter of fact, in some cases they have never worked anywhere else.

Steady work, our retirement system, and other benefits present an attraction for our men.

Whenever a new man, starting as a helper, shows ability and aggressiveness, he is encouraged and guided to a mechanic's status and rate. He is further encouraged by the future possibility of becoming a "lead man" and later gaining a foreman's job.

Conditions most important

By R. H. ANDERSON
Division Master Carpenter, Great Northern, Grand Forks, N. D.

The solution to this problem is not to be found by making a comparison of wages paid, but by providing attractive working conditions and modern, efficient equipment.

Floating outfit car gangs are obsolete. All of them, or as many of them as you can dispose of, should be retired. Workers no longer look forward to working five days a week away from home, whether expenses are paid or not. Men eating, sleeping and working together week in and week out on the road get on each

others' nerves due to their confinement. The result is dissatisfied and unproductive workers. In towns where outfits are set out, the workers are accepted as transients. Passes for weekend trips home are a big item and contribute to a shortage of seat space for revenue passengers. Absenteeism of the worker, due to family problems or other conditions, handicaps the foreman in carrying out work.

Modern outfit cars are a costly investment in themselves. Their maintenance and upkeep, by car department forces, is another expense. They clutter up yard and industry tracks, delay train movements and represent costly switching charges. Travel time for workers contributes to costs. Tri-weekly service, on some branch lines, contributes to delays in the movement of outfit cars and further adds to costs.

Working limits of outfit car gangs are restricted to the motor car. Train movements and weather conditions interfere with the carrying out of work. The only lost-time accident that occurred in this department on this division in the last five years happened in September 1955 due to a motor car derailment where we had a motor car and push-car crane assigned to an outfit car gang. Three men were injured in this one accident. The accident occurred at the end of a cold, windy and hard day shortly after the return trip was started.

Through the foresight of management, a five-year capital expenditure program was set up in 1953. On this division, it included, in part, the re-

placement of three B&B outfit car gangs with modern bus gangs equipped with portable equipment. In 1952 we had 14 B&B crews assigned on the division. Five crews were bus gangs, and there was 1 crew at the division point and 8 outfit gangs. Today we have a total of 11 crews of which 8 are bus gangs. One of the two remaining outfit gangs has been recommended for replacement with a bus gang next year, and the other outfit will be recommended for replacement or retirement the following year.

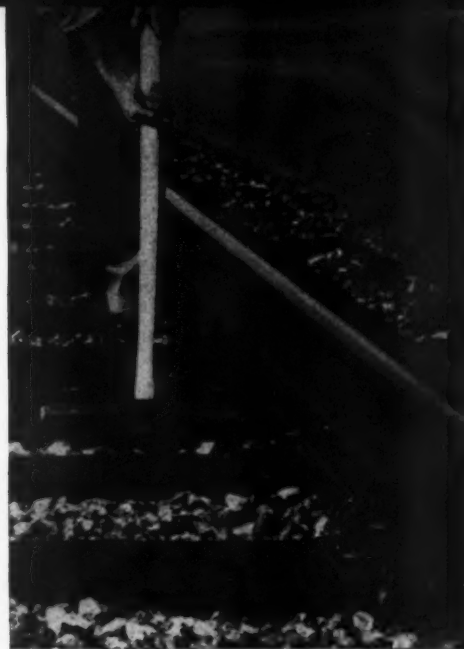
The division, consisting of 1,706 miles, is being maintained with three less crews and, because of the smaller crews required with the bus gangs, now represents an authorized force of 39 men less than that worked five years ago. The annual savings in man-hours are evident as well as the savings from retiring the outfits.

The bus gangs are set up with permanent headquarters in towns at strategic points on the division. The crews average nine men each, including the foreman. New and modern steel buildings serve as their headquarters. A garage, shop and small office for the foreman are included in these buildings. A new modern school-type bus, motor car and two-wheel highway trailer (on the market) afford a mobile unit. Space is provided in the rear of the bus for tools and power equipment. Each bus crew is self sufficient.

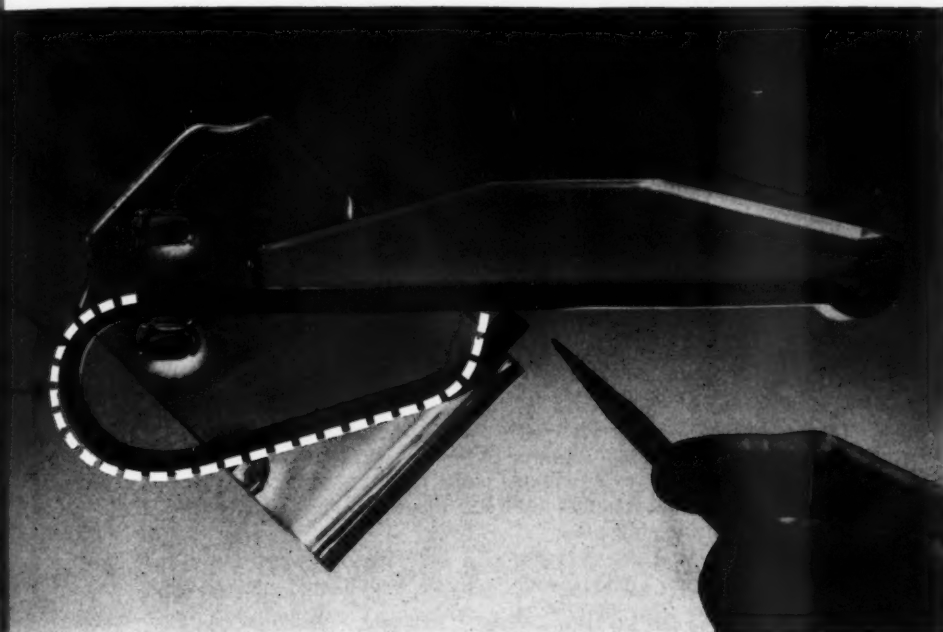
Through supervision and training we have eliminated the so-called "specialized crews." No one crew specializes in concrete work, pile driving, laying floor tile and interior work, plaster and brickwork, remodeling or construction of depots and buildings. Each gang carries out the work in its own territory. The service foreman and pipe fitters assigned on the division take care of this type of work. A division electrician and helper assigned to the B&B depart-

Here's why Bulldog Rail Anchors are best for welded rail

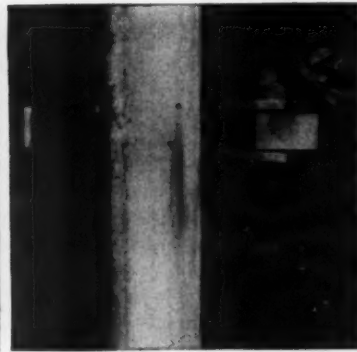
YOU CAN'T SKIMP on the number of anchors used to hold welded rail. Positive anticreep protection calls for plenty of anchors with high holding power. And economical installation calls for anchors that are fast and easy to apply. You get this combination with True Temper's improved BULLDOG Rail Anchors.



APPLICATION IS EASY, with only one or two hammer blows needed to install new BULLDOG anchors. Time and effort is cut in half. Transparent model shows how loop in the spring has been flattened to raise the point (A) where hammer strikes the spring. This results in a straighter, more direct path between striking point and end of the spring which engages the rail flange. Old design (dotted line) allowed much of the striking force (B) to travel down and around the wider loop. New design allows the spring to move with less friction, is angled to ride over clamp base (at point indicated by pencil) to minimize "pop back" during installation.



HIGH HOLDING POWER comes from BULLDOG's two-way compression grip and the great tension of the spring—holding power is 25% greater than on previous anchor. Side view shows how broad, flat tie-bearing surface transmits load over a wide area. Top view shows that the anchor does not bear on the tie plate—cannot loosen the plate. True Temper Corporation, Railway Appliances Division, 1623 Euclid Avenue, Cleveland 15, O.



OTHER TRUE TEMPER RAILWAY PRODUCTS: BULLDOG Ballast Forks, Wood Cutters • BULLDOG Shovels • BULLDOG Safety Rail Forks, Hammers, Sledges • BULLDOG Scythes

TRUE TEMPER



**BULLDOG
RAIL ANCHORS**

YOU CAN LOOK TO  FOR LEADERSHIP

What's the answer? (cont'd)

ment have been handling the biggest part of the electrical work recently.

Workers in the crews are given an opportunity to apply themselves and become high caliber construction men. They are satisfied, productive workers. Our experienced workers

stay with us and the establishing of the bus gangs in the smaller towns gives us a permanent local source of supply of future railroad workers.

Management profits from this increased efficiency of the worker. The resulting savings, improved safety standings and less interference with train movements are all steps toward reducing the operating ratio.

Through his permanent assignment, with headquarters *at home* in his own town, the worker becomes a family man playing his part in the life and growth of the community, the same as his neighbor. He is doing his part in selling the railroad and the payroll is contributing to the future of that community as well as the railroad.

Use of 'ready-mixed' concrete

What factors determine whether to use commercially "ready-mixed" concrete or concrete mixed at the site by B&B forces? Can the desired control be exercised over the physical properties of commercially prepared concrete? Explain.

Problem in economics

By R. H. PATTERSON

Bridge & Building Supervisor, St. Louis
Southwestern, Pine Bluff, Ark.

The determining factor in whether to use ready-mixed (transit-mixed) concrete or job-mixed concrete is a problem in economics. The factors to consider are: Availability of a reliable source of ready-mixed concrete project location, cost of concrete, size of gang and quantity desired.

We are fortunate to have in this area reliable sources of ready-mixed concrete at most towns along our railroad. These plants produce a uniform mixture of concrete having required strength as per state highway specifications. These plants have tests made of all materials used and cylinders tested periodically, thus assuring the user of receiving the product desired.

There are probably locations on all railroads that are inaccessible to highway vehicles and use of ready-mixed concrete is usually precluded at these places.

To accurately determine the cost of job-mixed concrete the following factors have to be considered: Quantity of concrete desired; project; project location; and size and type of mixer available.

The cost of job-mixed concrete per cubic yard theoretically diminishes with each cubic yard produced on the job, as the cost of setting up and dismantling the plant is prorated to each cubic yard. The cost of transporting

concrete from the mixer to the project should be added into the cost of job-mixed concrete as this cost is included in ready-mixed concrete.

Since our B&B gangs are stable in size, we are somewhat handicapped in always performing our work economically. This is true in concrete work as your gang should be designed for the project to avoid wasting labor. If you are pouring a job that requires mass concrete, your forming and finishing costs are less, resulting in more labor available for handling mixing and placing concrete. If your job is floors and walls, less men will be available for mixing and placing, thus retarding progress on the job as the amount of yardage handled will be limited by the mixing plant. If ready-mixed concrete were used, your controlling factor would be your finishing crews and since more men would be available for forming and finishing, more concrete could be handled per day.

It has been our experience that you can secure a more uniform mixture with ready-mixed concrete than with job-mixed. There seems to be a tendency among B&B men to use too much water when job-mixing concrete; apparently they do this to make the pouring easier, not realizing that they are weakening the product.

By our own cost comparison, we have found that it is more economical to use ready-mix concrete in lieu of job-mixed concrete even in our terminals and shop areas where we have favorable factors for job mixed concrete.

Consider several factors

By L. C. CANTWELL

Supervisor Bridges & Buildings, Norfolk
& Western, Portsmouth, Ohio

The factors to be considered in determining use of commercial "ready-mixed" or the concrete mixed by our B&B forces at site of job, are according to my opinion, as follows, in order of their importance:

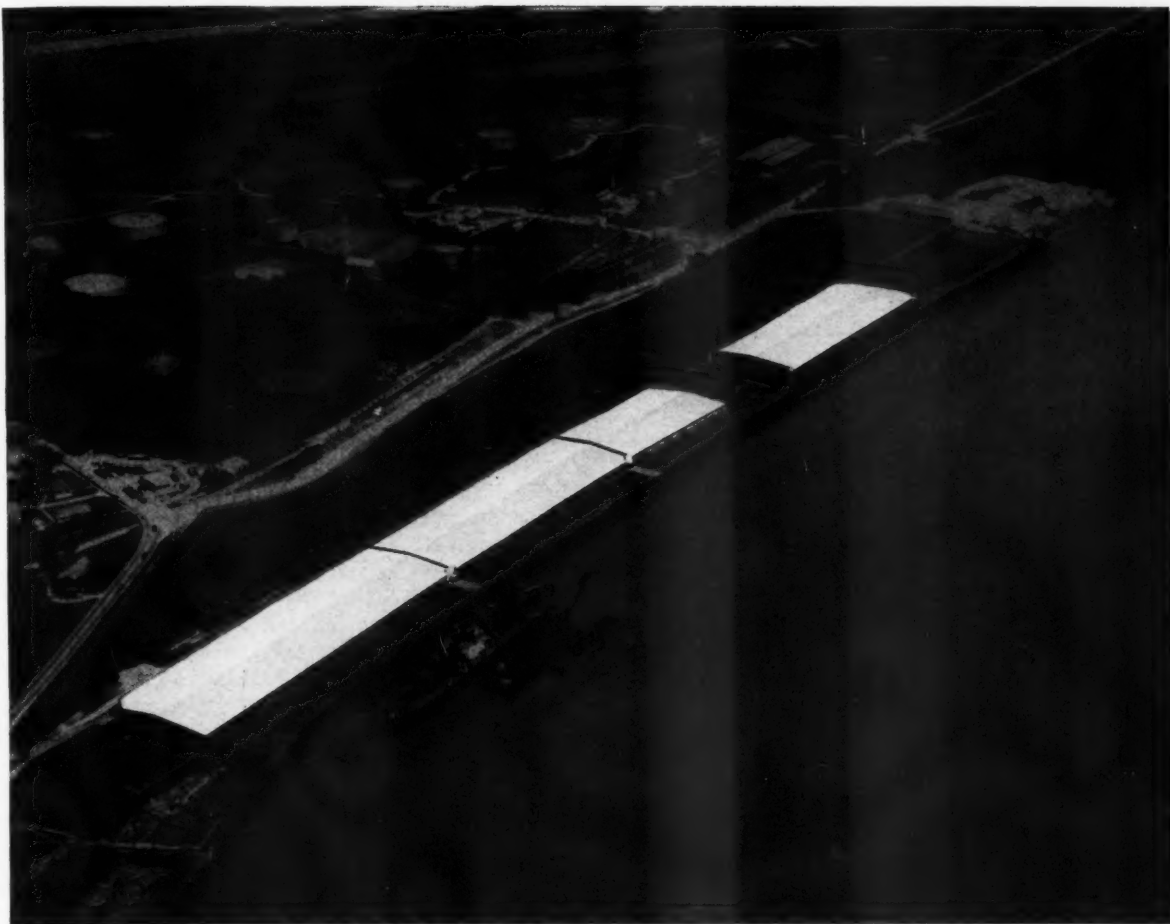
(1) Quality of ready-mixed concrete, to be compared to the quality of concrete mixed according to the railroad company's specifications, using aggregates and cement that have been tested and approved by our test department. If this quality is equal, then the factor of use would be:

(2) Site of project and availability of ready-mixed concrete plant to same;

(3) Cost of ready-mixed concrete delivered to the job site by truck.

Proper control could be exercised over the materials used in commercial mixing plants and be maintained by having the aggregate and cement tested by our testing department before starting a job. If the materials are approved, a qualified inspector at the plant could check on cement ratio, weight of aggregates and quantities of water being used.

The cost of commercial ready-mixed concrete, checked against the cost of company-mixed concrete should not be considered as an important factor. The cost of loading and unloading material at the job site, cost of erecting bins for storage



This Westwego, Louisiana, railroad warehouse roof was made completely weatherproof with Tenkote Aluminum Asbestos Coating, a product of American Asbestos Products Company, Cleveland, Ohio

Tenkote Aluminum Roof Coating weatherproofs this Gulf Coast railroad warehouse

To protect its buildings from the Gulf Coast's summer sun, torrential rains and corrosive salt air, Texas Pacific-Missouri Pacific Terminal Railroad of New Orleans now specifies aluminum roof coatings.

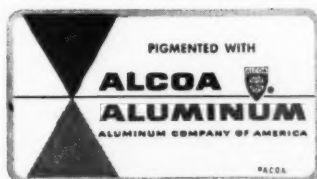
One key installation is the transshipping terminal shown above. Recently, this roof, covering acres, was coated with Tenkote, a combination of asphalt, asbestos and ALCOA® Aluminum Pigments.

Aluminum roof coatings like Tenkote provide waterproof shelter, protect against surface deterioration, reduce inside temperatures as much as 15°, reflect that sparkling aluminum appearance for years.

Tex Pac-Mo Pac management,

pleased with results, is now covering all of its other roofs with Tenkote. Aluminum asbestos coatings can be applied with an ordinary roofing brush or spray gun . . . come ready mixed . . . require no thinning or heating.

ALCOA does not make roof coatings. But we will gladly refer you to reputable manufacturers who do. Write today. Use the handy coupon.



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in protecting _____

Name _____

Company _____

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City _____ Zone _____ State _____

What's the answer? (cont'd)

of sand and gravel and houses for the storage of cement, cost of laying pipe lines for carrying water to mixing machines, setting up mixing machines and chutes, the razing and loading of all bins, the loading of machinery, etc., often costs more than the initial cost of ready-mixed concrete delivered to the site.

In the use of any kind of concrete we have found one of the most important factors is that of having a competent mason foreman on the job to properly judge the concrete that is being placed.

On-site mixing outmoded

By C. W. SCHLOSSER
Supervisor Bridges & Buildings, Pittsburgh
& Lake Erie, Pittsburgh, Pa.

In my opinion, concrete mixed on the site by B&B forces is as outmoded as the horse and buggy—there is always the chance of error in quantities of the aggregate and mechanical failure of equipment, plus the time element.

Unless it is absolutely impossible to have commercially "ready-mixed" concrete delivered to the job site, I think it would be ridiculous to consider on-the-job mixing. As a matter of fact, I have, at numerous times, transported "ready-mixed" concrete to the job site by track motor car and trailers (mounted with Convertor bodies) several miles, when access to the site by cement trucks was impossible.

I would mention that it is our policy to have an inspector at the supplier's plant when ready-mixed concrete is used, to check for possible deficiencies of the aggregate.

Usually the ready-mixed

By L. P. DREW
Assistant Chief Engineer, Union Pacific,
Omaha, Neb.

With the present heavy construction program in all areas and the considerable demand for mixed concrete, ready-mixed plants have been set up in all of the larger cities, most of the smaller ones and even in some of the small towns. It is, therefore, usually

more economical to purchase commercially ready-mixed concrete than to set up a plant and mix at the site.

The exception to this rule is when a large structure is contemplated where the quantity of concrete to be mixed is sufficient to justify the cost of setting up a mixing plant for the individual project.

One of the chief advantages of ready-mixed concrete is that large or small quantities can be delivered to the site where required at almost any moment without expense of starting up a mixing plant. The cost is usually not greater and oftentimes less than the cost of mixing in an individual plant.

Practically all of the commercially ready-mixed plants have the latest control devices for aggregates, sand, cement and water and any desired mix can be proportioned at the plant to meet an individual specification without any difficulty or increase in cost. In fact, the control of the mix in a ready-mixed plant is usually closer than can be obtained in an individual plant.

With the use of mix-in-transit trucks, concrete can be batched at the central plant, hauled a considerable distance and arrive at the place of placement in perfect condition for placing in the forms, with the result that the finished concrete is usually more consistent and of a better quality than can be obtained in an individual plant.

Many variables

By N. D. BRYANT
General Foreman Bridges & Buildings and
Water Service, St. Louis-San Francisco,
Chaffee, Mo.

A great many factors affect the desirability and advisability of using a truck-delivered, ready-mixed concrete or of mixing concrete at the job site by company B&B forces. The majority of these may be summarized as "economy of finished product." However, many variables enter into this classification among which are:

(1) Initial cost of the ready-mixed concrete; (2) availability and initial costs of cement and suitable aggregates; (3) type of terrain in the immediate vicinity of the job site; (4) train service required for unloading the material and equip-

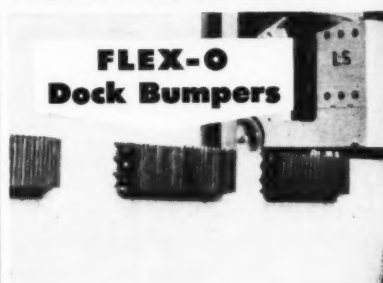
ment; (5) accessibility of the site from roadway; (6) distance from the ready-mixed plant to the job location; (7) temperature; and (8) amount of concrete required.

Undoubtedly many other factors could be included, each one peculiar to the individual project, but the aforementioned ones seem to be common to railroad concrete work.

Assuming ready-mixed concrete is available for a given job, one of the first things to be determined in considering whether to use commercially ready-mixed concrete or whether to mix the concrete by B&B forces, is the initial cost of the ready-mixed concrete delivered to the job site. Prices of ready-mixed concrete, at the plant or delivered to a location within the free-haul distance, vary in different geographical locations, depending upon the prevailing labor rates, and ready availability of cement and suitable aggregates.

Thus, an initial price per cubic yard of ready-mixed concrete could be economically feasible at one location on a railroad system, but at another location on the same rail-

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Engineering in Action

What's the answer? (cont'd)

road it could be much too expensive to use, other factors remaining constant. In addition to the initial price of the ready-mixed concrete at the plant, the charge for delivery beyond the free-haul distance, per cubic yard, must be considered.

In order to build a concrete structure economically, using concrete mixed at the site by B&B forces, suitable aggregates must be available in such quantity and at such prices as to

be competitive with the costs of these materials as supplied to commercial ready-mixed concrete companies. In many instances these companies are so located as to have access to suitable aggregates, which precludes any competitive prices. Cement should be available at a price low enough to compensate for loss due to sacks being broken in transit, and for loss due to water absorption—which frequently occurs on projects where proper storage facilities are not available.

The type of terrain in the imme-

diate vicinity of the job site plays an important part in determining which type of operation to use. If the concrete project is a bridge pier, abutment, etc., it is probable that a comparatively high fill will be adjacent to the job site. In most cases of this type, it is a costly process to set up a batch plant. If a grade crossing is near enough ready-mix trucks can be backed down the track. In cases where the distance from the grade crossing to the job site is too great for this, a hopper-type push car could be employed to transport the concrete from the truck to the job site.

On some territories where train service is such that a work train must be used to unload the materials and equipment, the overhead cost of work train service on smaller jobs could prohibit the use of concrete mixed on the site by company B&B forces. Conversely, if the project was of such size that the work train cost was a relatively small proportion of the total cost of the concrete work, this item would be negligible in determining which type of operation to use.

In addition to the cost factor the distance between the plant and the job site could prohibit the use of ready-mixed concrete in another manner. ASTM C94 specifies that concrete must be discharged from the truck mixer or agitator truck within 1½ hours after introduction of the water to the cement and aggregate or the cement to the aggregate. Thus, if the distance to be traveled is great enough to cause the agitating time to be greater than 1½ hours, the use of ready-mixed concrete must be ruled out.

In extremely hot, dry weather, concrete that has been in transit in an agitator truck for a considerable length of time tends to dry out and stiffen. If, in this circumstance, the strictest supervision is not employed, it is probable that a concrete gang foreman will add additional water to the ready-mixed concrete to make the mixture more workable and to make placement and puddling easier. This lowers the quality just as would a larger amount of water in the original mixing. When mixing concrete on the job this type of weather does not materially affect the concrete since the elapsed time from the mixer to the placed location of the concrete is simply a matter of minutes.

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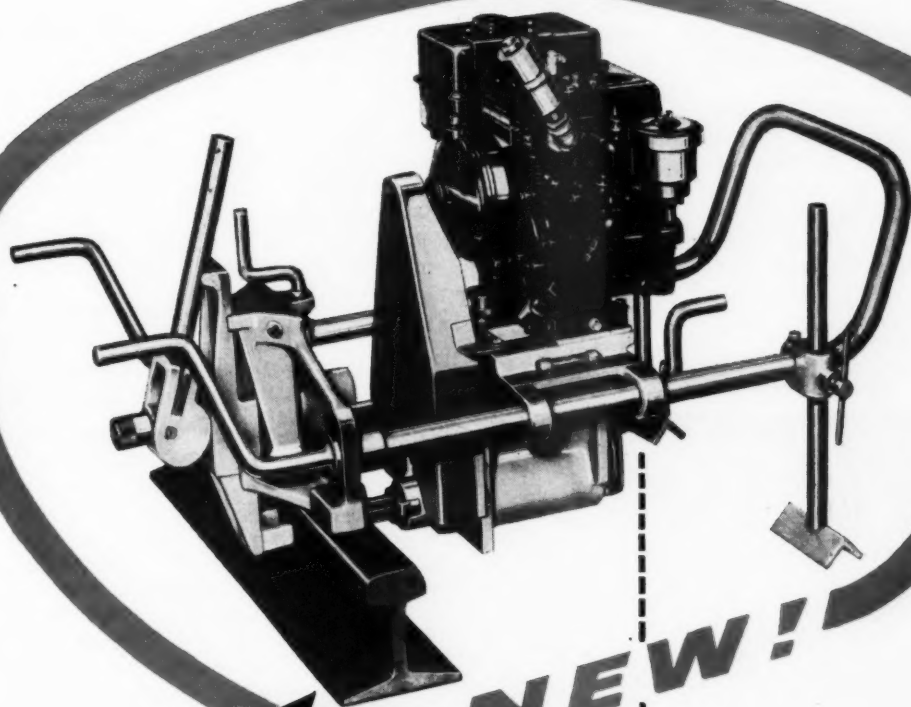
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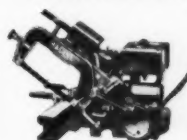
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What's the answer? (cont'd)

The amount of concrete that is required for a specific project can be an important factor in deciding whether to mix the concrete on the job or to use a commercial ready-mixed concrete. This factor is integrally related with the previously listed factors. If the quantity required is great enough, a lower unit cost per cubic yard can usually be obtained from a commercial ready-mixed company.

The desired control over the physical properties of commercially prepared concrete can be exercised, in most cases, much more closely in a commercial plant than it can be with concrete mixed at the site by B&B forces.

Since most commercial ready-mixed concrete companies utilize the services of an independent testing laboratory, the desired physical properties can be obtained in the ready-mixed concrete by simply stating those properties required.

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Demonstrations of equipment

Many manufacturers of M/W machines are following the practice of holding demonstrations of their equipment in operation. What value do you place on such demonstrations? Can they be made of greater value to you? Explain.

Have definite value

By R. R. SMITH

Engineer Maintenance of Way-System,
New York Central, New York

Demonstrations by manufacturers of M/W machines have a definite value to this railroad. In the past ten years trackwork machinery has gone, and is continuing to go, through an evolutionary period in which the improvements in trackwork practices have been so rapid that the machines which we ultimately purchase are practically custom-made items, rather than mass-produced units.

The initial cost of machinery in this country has risen to such an extent that, on a large railroad system which would of necessity require many machines to be purchased to accomplish its maintenance program, it is necessary that our men spend time observing demonstrations by manufacturers, which aid in generating ideas and provide a common ground for cooperation between the railroads and the supply industry to produce machinery which is economically justified.

Demonstrations vital

By T. P. POLSON

Chief Engineer, New York, New Haven & Hartford, New Haven, Conn.

All maintenance-of-way machines should be seen in action before they are purchased, in order to determine their adaptability to conditions on the railroad on which they are to be used.

Machines purchased by the New Haven in the past several years have been demonstrated by the seller to those in charge of the department in which they are to be used. The superintendent of work equipment is also on hand for such demonstrations.

Because of variations in construction, maintenance, operation and

traffic on different railroads and, in fact, on many lines of one railroad, pictures, writeups, charts, etc., do not afford sufficient information to determine what the machine will do in the location where it is intended to be used.

When new machines are placed on the market, a program should be set up by the seller for a demonstration. This program should be advertised a sufficient time in advance so that all interested personnel on nearby railroads may make plans to attend.

Show under typical conditions

By J. C. JACOBS

Engineer Maintenance of Way, Illinois Central, Chicago

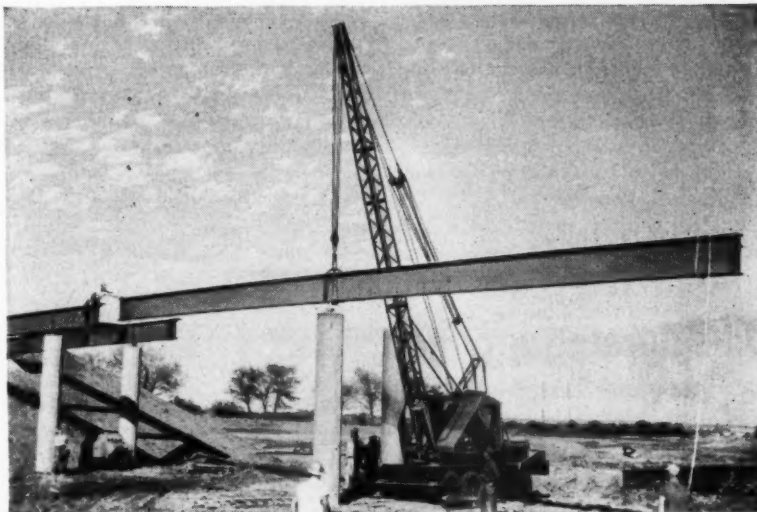
The value derived from field demonstrations depends on the actual performance of the machines and on the conditions and circumstances surrounding the demonstrations. Certainly, if performance of the machine does not confirm the advantages or economies claimed by the manufacturer, the demonstration would damage rather than help its reputation. At the same time, maintenance engineers who might have come from a considerable distance to observe its operation would likely feel that their time had been wasted.

On the other hand, a machine which performs as well as, or better than, anticipated should make the demonstration worth while both from the standpoint of the manufacturer and the prospective user.

To be of the most value such demonstrations should be made under typical working conditions so as to give the viewers some idea as to how they might expect the machine to perform on their own jobs.

Many maintenance machines will work under widely varying conditions on different railroads or on different parts of a railroad. At best, a demonstration can serve only to give a general idea as to the work which can be done by a specific machine. The real test and the only one on which intelligent evaluation can be based is one which will cover a period of days or weeks under actual day-to-day working conditions. Such a test can best be made on the railroad which is interested in evaluating the machine.

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What's the answer? (cont'd)

A maintenance engineer attending a demonstration of this sort does so in order that he may acquaint himself with the possibilities of the machine under conditions such as would be encountered on his own railroad. The more unbiased information which can be furnished to him either through observation, printed material, or both, at such a demonstration, the more he will feel that his time in attending has been justified.

Summarizing, the value to me of

such a demonstration is dependent on the extent to which it can show what can be done by the machine under the conditions applying on the work where we would be interested in using it. Any demonstration is more informative than is a written or illustrated description, and an opportunity to view briefly a machine operating under simulated working conditions may give one enough of an idea as to its possibilities that he may determine whether or not a further trial on his own railroad is justified.

Oil-saturated ground

What methods can be used to remove oil from ground which has been saturated at lubricating and fueling facilities? What other means can be used to correct such conditions? Explain.

Depends upon extent

By ASSISTANT ENGINEER

There are several methods which can be used to remove oil from ground which has been saturated at lubricating and fueling facilities. The method used depends primarily upon the extent to which the oil has spread. As a general rule, there is far less ground saturation by spilled oil today in our modern diesel servicing facilities than there was in the past at some oil-fired steam locomotive terminals.

If the area of oil-saturated ground is reasonably small, it is often most economical to dig out the saturated area, replacing it with clean material. In most cases, however, it will be found that the oil has penetrated deeply into the soil and, often as not, spread over a fairly wide subsurface area.

One method which has been used successfully in removing oil from such regions consists of pumping water into the subsurface table to float the oil to the surface. Under such an arrangement, the oil can be pumped directly from the ground and burned or reclaimed.

The primary disadvantage to oil-saturated ground is not, as some think, a case of fire hazard. More often, this oil seeps into the water table and contaminates drinking water supplies. There is also a case on record where spilled oil found its

way into a city sewage system and, through it to a disposal plant, with harmful effects on the latter.

An example of how such oil seepage may be removed was shown several years ago on an eastern railroad. In this case oil, over a long period of time, had escaped and had saturated the ground over a wide area. Matters were further complicated when the government moved an adjacent shore line 300 ft farther out by filling, thus causing all pipe outlets to be blocked.

When a nearby hotel complained to the railroad that the oil was getting into its basement, creating a hazard, the road was compelled to take steps to drain the oil from the ground. After consultation with engineers of an oil company, the road dug a ditch 3 ft wide, 2 ft deep, and 200 ft long. High tides then caused water and oil to enter the ditch, permitting the oil to be skimmed from the surface and pumped into tenders. In this way, oil was removed at the rate of 200 gal per week, and at the end of a year of such operations, 50 gal of oil was still being obtained each week.

Needless to say, the most efficient method of correcting such conditions is to see that little or no oil is spilled in and around the servicing facilities. Suitable precautions have, for the most part, been taken in the more recently constructed diesel servicing facilities.

BACK-OF-THE-BOOK

Briefs

Pressure Welds Reach 500,000 Mark

The Pennsylvania's Conway yard was recently the scene of an historic event—completion of the 500,000th oxy-acetylene pressure weld. The weld was made in 155-lb rail destined for laying in main track near Charlestown, Md.

Pressure welds have been in use approximately 18 years, according to an announcement of the Linde Air Products Company. However, a sizable portion of the half million welds made by this process was accounted for during the past two years. In 1956 alone, a total of 180,000 pressure welds was made, and prospects for 1957 are well beyond the 250,000 mark.

Aim at Standards For Pipeline Crossings

Elimination of the many problems caused by a multitude of varied specifications for pipeline crossings under railroads and highways is the aim of a new committee set up by the recently established Pipeline Division of the American Society of Civil Engineers. The new group is known as the Committee on Pipelines Under Crossings of Railroads and Highways, and consists of 25 engineers, including representatives of railroads, the U. S. Bureau of Public Roads, the Federal Power Commission, pipeline groups, gas and petroleum organizations, and others.

"The need for a standard for pipeline crossings for highways and railroads has become more urgent as longer and larger diameter pipelines are built, which cross literally hundreds of different state and local highways as well as railroads with a single pipeline," said an announcement.

It is believed that "a properly developed standard could greatly facilitate the issuance of permits of railroads and highways, thus cutting down the volume of correspondence often necessary for single pipeline crossing. It will assure the railroad or highway department of a safe, well-engineered crossing."

To Build 100-ft Truss Bridge for Testing

Engineers are going to find out exactly how a bridge reacts under load. They'll do it by means of a unique structure to be erected at Northwestern University in Evanston, Ill. (Chicago), as part of a \$250,000 research project. The undertaking, to be conducted by the civil engineering department of the Northwestern Technological Institute, will perform research on truss members and connections of the type used on most of the existing bridges in the United States.

The bridge will have a span of 100 ft. and will be approximately 20 ft. wide and 16 ft. high. It will be constructed of high-strength, low-alloy structural steel joined by high-strength bolts. For study, re-

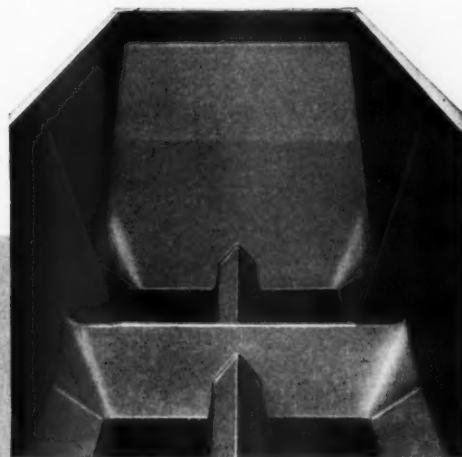


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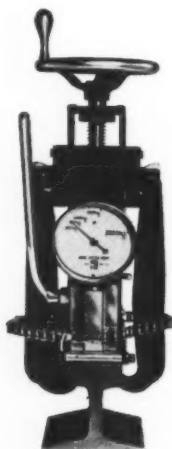
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Back-of-the-book briefs . . .

searchers will replace one or more of the members with ordinary structural steel and will use jacks to apply a load to the bridge. "We can then measure the effects of the load to the point of collapse on the ordinary steel members," said Lawrence T. Wyly, research professor of civil engineering at NTI and director of the project. "But other parts of the bridge will remain undamaged."

Financial support for the project has been pledged by the Association of American Railroads, the United States Army, and the United States Bureau of Public Roads. The research will be conducted by NTI engineers. C. H. Sandberg, assistant bridge engineer, system, of the Santa Fe, is chairman of a committee which will review the objectives, procedures and findings of the project, and offer constructive advice and criticism.

. . . About Supply Companies

A new production unit to manufacture sulfamic acid and "Ammate" weed and brush killers will be built by the **Du Pont Company** on the site of its present plant at East Chicago, Ind. "The new unit will double the company's production of these

two important products and will provide an adequate supply to meet future needs of our customers," said Clark W. Davis, general manager of the company's Grasselli Chemicals Department. Construction has started and it is expected that operations will begin late in 1957.

Rail anchor production capacity of the **Mid-West Forging & Manufacturing Co.**, Chicago, has been doubled, following completion of an addition to its forge shop at Chicago Heights, Ill. Mid-West makes and sells the Improved Gautier Rail Anchor and produces the Double-U anchor for Achuff Railway Supply Company, St. Louis, Mo.

The Chemocem Company has moved its office from 67 Wall Street to 72 Wall Street, New York, effective May 1.

Sperry Rail Service, Danbury, Conn., a division of Sperry Products, Inc., announces it has obtained exclusive world marketing rights, in the field of railroad communications, to a diversified line of radio equipment manufactured by Harmon Electronics Company, Independence, 41 Mo. According to the announcement, the new Harmon line will enable Sperry to meet the broadest and most specialized communication requirements of today's railroads in main-line, yard or maintenance applications.

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The Agricultural Sales Department of the **United States Borax & Chemical Corp.** was moved on April 1 from Kansas City to 3456 Peterson Ave., Chicago 45, Ill.

Claims have recently been accepted by the United States Department of Agriculture for the use of Geigy Simazin for general weed control on non-cropped land, according to an announcement by **Geigy Agricultural Chemicals**. This company is a division of Geigy Chemical Corporation, Saw Mill River Road, Ardsley, N. Y. It points out that Geigy Simazin 50W is a wettable powder containing 50 per cent active ingredient. The company recommends it for control of broad-leaf and grassy weeds in driveways, roadways, railroad road beds, walks, around buildings, at industrial sites and in similar non-cropped areas.

Biographical Briefs

(Continued from page 32)

ing as division engineer at Baltimore, Md., he was named engineer maintenance of way, Eastern region, at Baltimore in 1954.

Rudolf Widman, 43, recently appointed division engineer of the Southern Pacific at Los Angeles (*RT&S*, Dec., p. 82), graduated from the University of California and joined the Pacific Electric in 1940 as a junior engineer. After serving as assistant engineer he was named engineer maintenance of way of the PE in 1949 and in 1954 was named engineer maintenance and construction—the position he held before he joined the SP.

L. R. Lamport, who recently resigned as engineer of maintenance of the Chicago & North Western (see page 32), graduated from the University of Illinois in 1923, and served the road as tapeman, rodman, and instrumentman in South Dakota, Wyoming, Upper Michigan and Nebraska. He left the North Western in 1925 to take a post with the Illinois Central, and returned in 1927 as construction accountant at Chicago. He subsequently served as assistant engineer, supervisor of work equipment, division engineer at Sioux City, Iowa, and assistant to chief engineer. He was promoted to engineer of maintenance in 1946.

Maurice S. Reid, recently named engineer of maintenance of the Chicago & North Western (see page 32), joined the road in 1935 as a tapeman at Boone, Iowa, and was graduated from Iowa State College in 1940. He served as an officer in the



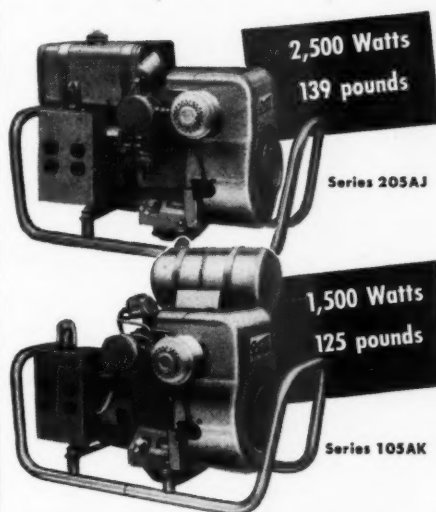
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WRITE Us for details! See what we have accomplished for the G.M.&O. and others. We can do it for you!

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MOW GRASS, WEEDS, MULCH LEAVES

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SWEEP WALKS, DRIVES WINTER OR SUMMER

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Cuts MAINTENANCE Cost!

Now! 30 Tools

Complete, year-round grounds maintenance is no job at all with Gravely!

The precise control, amazing ease of operation and riding comfort of the Steering Sulky with 75"-cut Gang Mowers make large-area mowing almost child's play. Rotary and Sickle Mower attachments take care of the smaller areas, right-of-ways, etc. Now, new Lawn Sweeper also available.

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Biographical briefs (cont'd)



James Cherrington
CPR



Earl E. Gordon
B&A

transportation corps during World War II, returning to the North Western as roadmaster at Ames, Iowa, after leaving the service. In 1948 he was named division engineer at St. Paul, Minn., later serving as division engineer at Madison, Wis. Last year he was named assistant engineer maintenance.

Earl E. Gordon, 57, recently appointed assistant to the chief engineer of the Bangor & Aroostook at Houlton, Me. (*RT&S*, Mar., p. 96), joined the B&A in 1917 as a trackman. He served as section foreman and roadmaster until 1950 when he was named general roadmaster.

James Cherrington, 56, recently promoted to district engineer on the Canadian Pacific at Vancouver, B. C. (*RT&S*, Feb., p. 58), graduated from the University of Alberta and joined the CPR in 1941 as a transitman. After serving as roadmaster and division engineer, he was appointed assistant district engineer in 1951.

Edward Green, 55, recently appointed division engineer on the Nickel Plate at Frankfort, Ind. (*RT&S*, Feb., p. 58), joined the NKP in 1924 as a rodman. He subsequently served as instrumentman and assistant engineer at Frankfort, and in 1945 he was promoted to assistant division engineer at Conneaut, Ohio. He was appointed assistant engineer in the general offices at Cleveland in 1952 and the following year was named resident engineer at Ft. Wayne, Ind.

Joseph F. Hoss, Jr., 29, recently named engineer of structural design, Southern Pacific, at San Francisco (*RT&S*, Mar., p. 96), is a graduate of Yale University. He joined the SP in 1954 as a structural draftsman and later that year was named associate structural designer. In 1955 he was named general bridge and building foreman at Portland, Ore.



Edward Green
NKP



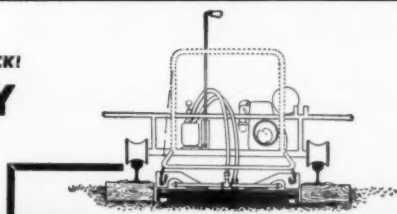
Joseph F. Hoss, Jr.
SP

RAILWAY TRACK and STRUCTURES

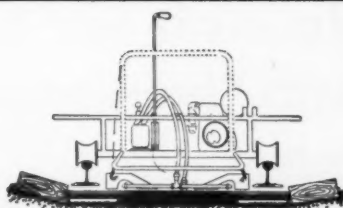
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NOW ELIMINATES SLOW,
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A double-ended hydraulic cylinder is then lowered into the tie bed. A simple turn of the valve moves these two pistons outward, pushing the tie-ends completely clear of the rail—whether



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"Wood engineered" for a smooth level-with-the-surface moisture tight seal without countersinking . . . Sealtite fins bear against wood on a radial plane to prevent turning when nuts are set. Available in Hot-Dip Galvanized finish for "Long Life Economy," in black for low first cost. Call, write or wire for sample prices.



Cross section of head from above, showing fins, bevel and shank.

Bolt available with Loktite Nut No. 2 or std. sq. (shown) and hexagon nuts.

All products are manufactured in the U.S.A. to A.S.T.M. specifications.

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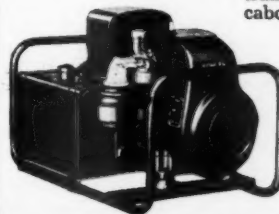


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top performance
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Model 2.5M25, 2500 watts, 115 volt AC. Manual starting.

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No wait for track clearance with "handyman" D Tournapull



When a call comes for emergency maintenance along your right-of-way, there's no wait for track clearance if you have a D Tournapull. This one-man maintenance machine starts immediately, travels along track embankment,

cross-country, via highway, or takes short-cuts on access roads at speeds to 29.5 mph to reach the job site.

While your "D" runs to the emergency assignment, revenue traffic on your mainline proceeds without interruption. You will not have to shuffle schedules, notify special work crews, organize a work train, or impose side-track delays along the line. D Tournapull, with only one operator, may be all the help you'll need.

Useful on all maintenance

Handyman "D" can handle dozens of maintenance jobs along your right-of-way. This 9-yd. scraper cuts ditches, spreads ballast, builds sidings, widens roadbed, raises grade, does a wide variety of work... quickly, and at low cost. Equipped with bulldozer blade, machine does many light dozing jobs, slopes banks, stockpiles coal, backfills around culverts and crossings. If snow blocks crossings and roads, "D" can plow it with optional snow plow. In

▲ Maneuverable D Tournapull climbs embankment, gives quick clearance for passenger train. Handy rig moves out from right-of-way in seconds; on most maintenance jobs machine can continue working while train passes.

congested areas, snow can be loaded in scraper bowl and hauled away.

Replaces many machines, many men

Study your present maintenance-of-way equipment fleet: the loaders, haulers, and other tools needed, the trailers or flat cars required to carry these machines to the job. Count the number of men you employ for this work, the time lost shifting them from their regular jobs to special assignments. Figure the time it takes to get this equipment fleet organized, and the time traveling to and completing the job, plus the time required moving to the next work location.

Compare this loss of time and money with the cost of one D Tournapull and one operator. You'll find that one or more "D's" can greatly reduce your equipment cost, do more maintenance work, keep your work crews occupied where they can be of greatest value.

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LeTourneau-WESTINGHOUSE Company

Railroad Sales Division
Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company



Biographical briefs (cont'd)

Wm. J. Hedley, 55, recently appointed chief engineer of the Wabash, at St. Louis (*RT&S*, Mar., p. 96), was graduated from Washington University and joined the Wabash in 1925 as a bridge draftsman at St. Louis. After serving as bridge inspector and assistant engineer at St. Louis, he was named resident engineer at Danville, Ill., in 1929, returning to St. Louis in 1930 as assistant engineer. In 1937 he was named construction engineer and in 1945 was promoted to assistant chief engineer.

C. E. Garcelon, 49, recently promoted to assistant to manager of operations of the Bangor & Aroostook at Houlton, Me. (see page 32), graduated from Bates College and joined the B&A in 1926 as chairman. He served subsequently as a trainman, B&B carpenter, bridge inspector, and B&B foreman until 1945 when he was named superintendent of bridges and buildings. He was promoted to superintendent of track and work equipment in December last year.

William H. Huffman, 46, recently appointed assistant engineer of maintenance of the Chicago & North Western (see page 32), joined the road as a rodman at Escanaba, Mich., following his graduation from Purdue University. He served as rodman and instrumentman at Madison, Wis., engineer accountant at Chicago, assistant engineer at Sioux City, Iowa, and as division engineer at St. Paul, Minn., and Escanaba, Mich. He was named division engineer at Chicago in 1948, and assistant engineer of maintenance in 1954.

John L. Hodgkinson, 28, recently appointed roadmaster on the Denver & Rio Grand Western at Denver, Colo. (*RT&S*, Mar., p. 98), graduated from Kansas State College and joined the D&RGW in 1954 as an architectural draftsman at Denver. After serving as assistant supervisor of structures, he was promoted to track supervisor at Grand Junction in January 1956.

P. V. Thelander, recently retired assistant chief engineer of the Chicago & North Western (see page 32), began railroading in 1911 as a rodman with the Mount Hood and the Petaluma & Santa Rosa in Oregon. He joined the North Western in 1913 as a rodman and served as instrumentman at Ashland, Wis., and for the Milwaukee Road at Chicago and the NKP at Cleveland. He served in the Engineering Corps in World War I, returned to the North Western as instru-



C. E. Garcelon
B&A



Wm. J. Hedley
Wabash

mentman in 1919, and served successively as assistant engineer and division engineer at Escanaba, Mich., and later at Chicago. He was named assistant engineer of maintenance at Chicago in 1947 and assistant chief engineer in 1952.

Harold W. Jensen, new engineer of track, Chicago & North Western (see page 32), graduated from the University of Wisconsin, joined the North Western in 1925 as a rodman and served later as inspector, instrumentman, assistant general bridge inspector, assistant construction accountant, assistant roadmaster, assistant engineer, and division engineer. He served as an officer in the Transportation Corps in World War II and returned to the North Western in 1946 as office engineer, later becoming division engineer. He was named assistant to chief engineer in 1947 and assistant engineer of maintenance in 1952.

John P. Datesman, recently named process engineer on the Chicago & North Western (see page 32), joined the road in 1919, and was appointed assistant engineer in 1926. He became roadmaster in 1934, drainage engineer in 1944, and division engineer at Green Bay, Wis., in 1947. He had served as engineer of track at Chicago since 1948.

Association News

Roadmasters Association

Two meetings of the Executive Committee are scheduled to be held during the spring and summer, the first on May 6 and the second on July 15. In both cases the meetings will be held at the Chicago Engineers' Club, beginning at 9:00 a.m., city time. The main item of business at both meetings will be the reading and discussion of the committee reports to be presented at the annual meeting which will be held September 23-25 at the Conrad Hilton Hotel, Chicago. The program for the convention has been virtually completed.

American Railway Engineering Association

In 1958 the association will return to Chicago for its annual meeting, which will be held at the Sherman Hotel, March 11-13. Simultaneously, there will be an exhibit of the National Railway Appliances Association, which will be held at the Coliseum.

At a special meeting of the Board of Direction at St. Louis on March 5, W. W. Hay, professor of railway civil engineering, University of Illinois, Urbana, Ill., was unanimously elected a director to fill the unexpired term (one year) of F. R. Woolford, chief engineer, Western Pacific, who was elected junior vice-president of the association in the regular election of officers, as reported in the April issue.

At press time, six standing committees of the association had scheduled meetings to be held in May, as follows: Roadway

For RR construction...maintenance



Drives on- or off-highway—One man and a modern Adams grader travels via right-of-way or highway to construction site or to scattered maintenance jobs... without waiting for rail transport... without need for special crew. An Adams grader saves time, cuts your payroll and machinery costs.

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Saves on maintenance — This modern grader maintains yards, roads, and right-of-way... makes repairs before major problems develop. An Adams grader cleans drainage ditches, widens shoulders, maintains banks and fills, smooths access roads, removes brush and weeds, and cleans up around stockpiles, bulk-cargo, docks, and yards.

Exclusive: 15 speeds — Only Adams heavy-duty graders have 8 speeds forward (to 26 mph) plus three optional creeper gears, and 4

reverse speeds (to 13 mph). No other make of grader provides the speed choices for work at fastest practical rate, with fast back-up for shuttle grading.

Exclusive: Double-action brakes — Only about half the usual pedal pressure is needed for quick, sure stops. Service brakes on both transmission and wheels act simultaneously to slow, stop, or hold grader.

Optional equipment — Scarifier rips out asphalt, hard-packed dirt, roots and rocks. Dozer blade pushes debris off right-of-way, backfills around culverts, cleans up spillage in yards. Snow plow and wing clear snow from yards, depot, freight areas and access roads.

Call or write for details on fast, versatile Adams graders.

A size ADAMS for every need

New POWER-Flow 660 —

190 hp with torque converter... 30,200 lbs.

Model 663* — 150 hp diesel... 30,050 lbs.

Model 550* — 123 hp diesel... 26,370 lbs.

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Model 220 — 60 hp G.M. diesel... 15,500 lbs.

*Choice of Cummins or General Motors engines.
(Weights shown are usual working weights)

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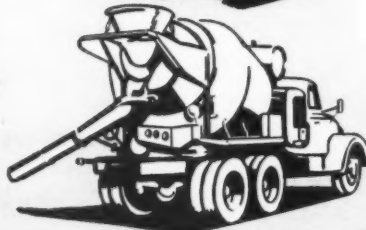
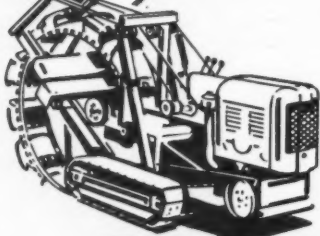
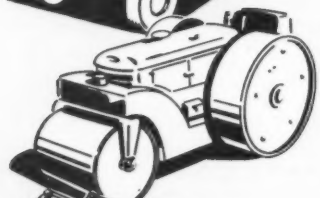
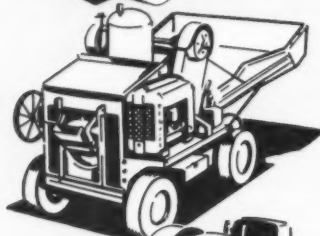
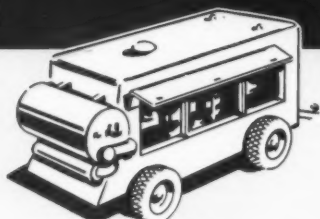
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Association News (cont'd)

and Ballast, May 7-8, Houston, Tex., including inspection trip to Southern Pacific yard; Track, May 15-16, Cincinnati, Ohio, including inspection trip to observe hold-down fastenings in test track at London, Ky.; Wood Bridges and Trestles, May 9-10, Leland hotel, Detroit, Mich.; Masonry, May 13-14, Hotel Bethlehem, Bethlehem, Pa., including inspection trip to Lehigh-Portland Cement Mill; Economics of Railway Labor, May 2-3, Pere Marquette Hotel, Peoria, Ill., including inspection trip to Caterpillar Tractor Company; and Waterproofing, May 21, AAR Research Center, Chicago.

Bridge & Building Association

The next meeting of the Executive Committee will be held on June 24 at the Chicago Engineers' Club, starting at 9:00 a.m., city time. The meeting will be devoted principally to the reading and discussion of the committee reports to be presented at the 1957 convention, which will be held at the Conrad Hilton Hotel, Chicago, September 23-25.

The Executive Committee, at its meeting on June 24, will also discuss details of the convention program. The convention, as usual, will be held concurrently with that of the Roadmasters' Association.

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, Sept. 23, 24, 25, Palmer House, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

American Railway Engineering Association—Neal D. Howard, Secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—W. A. Penrose, Secretary-treasurer, 839 Seventeenth street, N. W., Washington 6, D. C.

Bridge and Building Supply Association—L. R. Gurley, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—S. F. Kosco, Secretary-treasurer, 135 E. 11th Place Chicago 5.

Metropolitan Maintenance of Way Club—G. Rogers, Secretary-treasurer, 30 Church street, New York.

Mississippi Valley Maintenance of Way Club—R. B. Davis, Secretary-treasurer, 1025, Frisco Building, 906 Olive street, St. Louis 1, Mo.

National Railway Appliances Association—J. B. Templeton, Secretary, 1020 So. Central avenue, Chicago 44; Lewis Thomas, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Railway Tie Association—Roy M. Edmonds, Secretary-treasurer, 1221 Locust street, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, Sept. 23, 24, 25, Palmer House, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago 5.

RAILWAY TRACK and STRUCTURES

Helps from manufacturers

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

STEEL BUILDINGS. A new manual is available describing the Steelox panel method of construction. The booklet describes the S-2 frameless, S-3 rigid frame, shed roof, and utility buildings. Accessories and special features are covered in some detail. (Write: *Product Information Service, Armco Drainage & Metal Products, Inc., Dept. RTS, Middletown, Ohio.*)

BUILDING PRODUCTS. A recently published bulletin is now available discussing the advantages of Aluminized Steel (aluminum-coated) building products. Among the products described are roof decking, roofing and siding, rolling doors and roof ventilators for steel buildings. Corrosion resistance, strength, attractive appearance, heat reflectivity, and fire resistance are listed as advantages, and typical installations are shown. The bulletin is designated as PO5656. (Write: *Product Information Service, Armco Steel Corporation, Dept. RTS, Middletown, Ohio.*)

MOTOR GRADERS. Working advantages provided by the manufacturer's Model 45 motor grader are covered in a new 16-page, 2-color catalog which is designated MS1148. Photographs, sketches and other instructive illustrations are incorporated to aid the reader visualizing details of the motor scraper's mechanical features and components. On-the-job photographs are included along with a listing and description of attachments and accessories and complete specifications. (Write: *Allis-Chalmers Mfg. Co., Tractor Group, Dept. RTS, Milwaukee, Wis.*)

GRATINGS AND TREADS. A 28-page, two-color illustrated bulletin on grating and treads has recently been published by the manufacturer. The new bulletin presents descriptions on electroforged, riveted, rectangular, diagonal, "U" type and "T" interlocked grating and treads. Tables on safe loads and information necessary to specify are also included in the catalog, which is designated as Bulletin No. 2527. (Write: *Grating Department, Blaw-Knox Company, Dept. RTS, P. O. Box 1198, Pittsburgh 30, Pa.*)

MOTOR GRADERS. A new multi-page booklet, describing the various jobs handled by motor graders in action, has recently been released by the manufacturer. The booklet illustrates the versatility of the unit through on-the-job photographs of machines doing bank sloping, road construction, ditching, and other operations. (Write: *Caterpillar Tractor Company, Advertising Division, Dept. RTS, Peoria, Ill.*)

PIPING. How to identify any piping system by colors and lettering is outlined in a new manual on pipe identification just released by the manufacturer. The man-

ual, entitled "How to Identify Your Piping System," contains specifications laid down and approved by the American Standards Association in conjunction with the National Safety Council and the American Society of Mechanical Engineers. It tells the color to be used for each class of fluids and gases. It also reproduces the colors in actual tones, gives sizes and frequency of legends, and complete explanations of the dual methods recommended—by color and by legend. (Write: *Rust Oleum Corporation, Dept. RTS, 2799 Oakton St., Evanston, Ill.*)

WROUGHT IRON. Railroad services for wrought iron are highlighted in a new 36-page booklet entitled "Wrought Iron for

Railroads," now available. The two-color booklet illustrates some of the mechanical and engineering railroad applications of wrought iron, including bridge decking, members and appurtenances. (Write: *A. M. Byers Company, Dept. RTS, P. O. Box 1076, Pittsburgh 30, Pa.*)

FLOOR PADS. A new catalog sheet, illustrating and describing the manufacturer's new line of Flex-O-Rubber Floor Pads, has recently been released. The literature contains detailed specifications and installation information, plus complete descriptive data. Numerous engineering drawings and diagrams are also included. (Write: *Bumpers, Inc., Dept. RTS, 2534 Detroit Ave., Cleveland 13, Ohio.*)

REPUBLIC

Onondaga Point Naval Station

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Creosoted wood is still your most dependable material for salt or fresh water submersion . . . and Republic creosoted wood products have been favorites with construction firms for years.


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POLE PULLING AND STRAIGHTENING JACKS

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tightening and pulling
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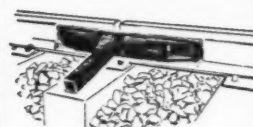
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Permit crossing and
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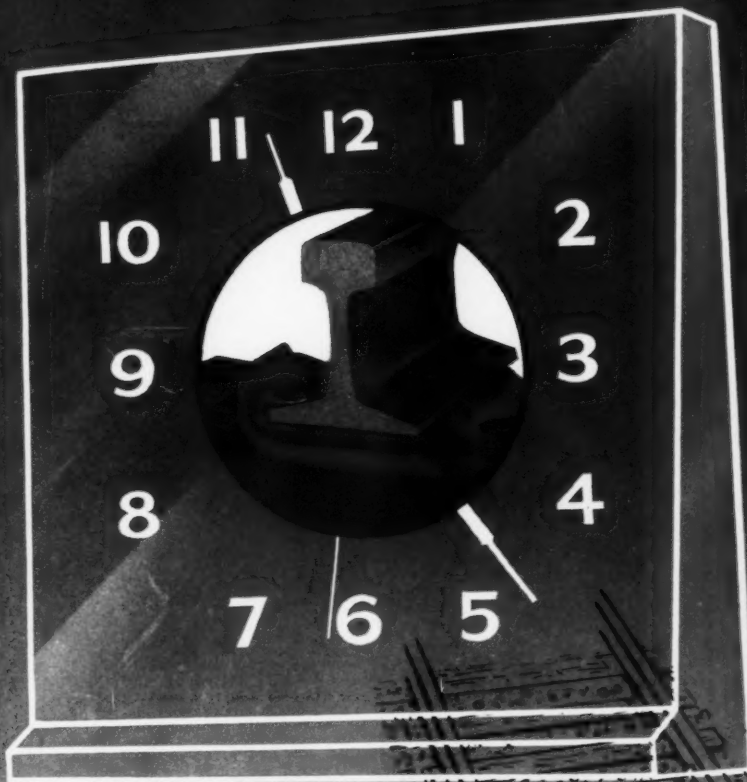
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ENGINE POWER CERTIFICATION

This is to certify that the Diesel Engine herein described has been engineered, manufactured and tested in accordance with rigid Caterpillar Standards. The materials and workmanship incorporated into this engine give it the inherent capacity for satisfactory performance when applied in accordance with the power ratings established and recommended by this company. The MAXIMUM OUTPUT capacity of this standard production engine is 200 H.P. @ 2000 R.P.M. equipped with: air cleaner, water pump, lubricating oil pump, fuel pump, and standard intake and exhaust manifolds.

I certify that B. L. Henson, Supervisor of Diesel Engine Test, Caterpillar Tractor Co., is authorized to certify and I affix my signature and seal to this certificate.

B. L. Henson
Supervisor Diesel Engine Test
Caterpillar Tractor Co.
Peoria, Illinois

Caterpillar Model D326 Industrial was manufactured and shipped as follows: Engine Serial No. 39B1018 Shipping Date February 11, 1957
Power Setting 152 H.P. @ 1600 R.P.M. Intermittent Power Rating
Radiator & Fan
Ether Starting Aid
32V Charging Generator
Governor Control
Tachometer Drive
Muffler
Heater Connections
Remote Shut-off

POWER RATINGS

MAXIMUM OUTPUT is the horsepower capacity of the engine, a measure of the maximum power, $\pm 5\%$, that can be developed for five minutes without drop in speed.

INTERMITTENT HORSEPOWER is a rating for use in variable load applications such as excavators, hoists, and standby power units, where the duration of sustained full power output is one hour or less, with the average output not over 80% of Intermittent Horsepower.

RATED HORSEPOWER is a rating for use in applications such as planing mills, hammer mills, and rock crushers where the duration of sustained full power output is 12 hours or less.

CONTINUOUS HORSEPOWER is a rating for use in applications such as work-boats and pumps where the duration of sustained full power output is 24 hours per day, day in—day out.

Horsepower figures are established in accordance with rigid Caterpillar standards. All ratings, corrected to sea level barometric pressure (29.92 in. Hg.) and standard temperature (60°F), apply to a production engine including air cleaner, water pump, lubricating oil pump, fuel pump and standard intake and exhaust manifolds. The above ratings are based on British and American BHP.

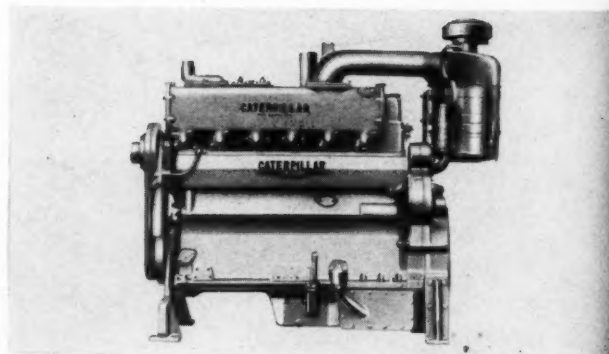
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Now, to back this reputation, Caterpillar becomes the *first* manufacturer to issue a certificate showing the horsepower capabilities of the engine. This certificate is signed by Caterpillar Tractor Co. and certified by a notary public.

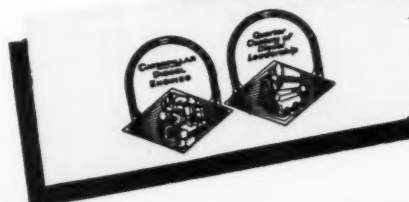
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Caterpillar Tractor Co., Peoria, Illinois, U. S. A.



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